GEOTECHNICAL DATA REPORT
PART 1 GEOTECHNICAL INVESTIGATION
BATTLESHIP TEXAS DRY BERTH
TPWD PROJECT NO. 101887

SUBMITTED TO
AECOM
5757 WOODWAY DRIVE, SUITE 101 WEST
HOUSTON, TEXAS 77057

BY
HVJ ASSOCIATES, INC.
HOUSTON, TEXAS
FEBRUARY 25, 2011

REPORT NO. HG1015021-1

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February 25, 2011

Mr. Jerry Farhat, PE
AECOM
5757 Woodway Drive, Suite 101 West
Houston, Texas 77057

Re: Geotechnical Data Report
Part 1 Geotechnical Investigation
Battleship Texas Dry Berth
TPWD Project No. 101887
Owner: Texas Parks and Wildlife
HVJ Report No. HG1015021-1

Dear Mr. Farhat:

Submitted herein is the data report of our Phase I geotechnical investigation for the above referenced project. The study was performed in accordance with our proposal number HG1015021 dated September 21, 2010.

It has been a pleasure working for you on this project and we appreciate the opportunity to be of service. Please notify us if there are questions or if we may be of further assistance.

Sincerely,

HVJ ASSOCIATES, INC.
Texas Firm Registration No. F-000646

Michael Hasen, PE
Executive Vice President

MH/SV/NL:pc

Copies submitted: 1 (electronic)

The seal appearing on this document was authorized by Michael Hasen, PE 57498 on February 25, 2011. Alteration of a sealed document without proper notification to the responsible engineer is an offense under the Texas Engineering Practice Act.

The following lists the pages which complete this report:

- Main Text - 11 pages
- Plates – 5 pages
- Appendix A – 33 pages
- Appendix B – 3 pages
- Appendix C – 3 pages
- Appendix D – 14 pages
- Appendix E – 13 pages
- Appendix F – 8 pages
- Appendix G – 22 pages
- Appendix H – 13 pages

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1. EXECUTIVE SUMMARY

HVJ Associates, Inc. was retained by AECOM to provide a geotechnical investigation for the dry berth of Battleship Texas in Houston, Texas. The project will involve conversion of the existing berth from wet to dry by constructing a wall or earthen embankment at the end of the existing slip. The ship will be supported on deep foundations beneath the keel, although a mat foundation option will also be considered. The investigation will be performed in two parts. Part 1 of our study is intended to provide the information needed to support preliminary design and cost estimates for the evaluation of a recommended design. Part 2 is intended to provide additional investigation needed to support detailed design of the selected alternative.

The subsurface stratigraphy at the project site was determined by drilling and sampling one 300-foot boring and two 120-foot borings on land; and three 150-foot borings in water. Based on the subsurface conditions revealed by the test borings, the findings and recommendations of this report are summarized below:

1 The subsurface soils generally comprise of very soft to hard fat clays, sandy lean clays and lean clays to the termination depth of the borings. Loose to very dense cohesionless clayey sands, silty sands, sandy silts and silts were encountered between elevations -6 feet and -11 feet in boring B-1; between elevations -4 feet and -9 feet, and between elevations -69 feet and -74 feet in boring B-2; between elevations -212 feet and -238 feet, and below elevation -283 feet in boring B-3; between elevations -64 feet and -74 feet, between elevations -84.5 feet to -89.5 feet and between elevations -134.5 feet and -139.5 feet in boring B-4. Fill material comprising of fat clay and sandy lean clay with shells and rocks was encountered between elevations +11 feet and -1 feet at boring locations B-1 and B-3. Ferrous and calcareous nodules were encountered at various depths in all the borings.

2 Groundwater was encountered at elevations ranging between -4 feet and 0 feet during the drilling operations. Two 40-foot piezometers were installed to monitor groundwater elevation behind the slope. Water level readings in the piezometers ranged between +0.74 feet and +1.47 feet. Piezometer installation report is presented in Appendix C.

3 A review of surface faults was made from geologic literature and available in-house records. The primary objective of the review was to evaluate available information from these reports concerning the presence of active faults in the project area. Based on our review, Deepwater fault is located at about 4 miles southwest of the project site, Battlegrounds fault is located about 2 miles southeast of the project site, and Wooster fault is located about 3 miles northeast of the project site. We do not anticipate faulting may impact the project site. However, it should be noted that unmapped faults that could impact the project may exist within the project area. A detailed fault study is beyond the scope of this study.

Please note that this executive summary does not fully relate our findings and opinions. These findings and opinions are only presented through our full report.

2. INTRODUCTION

2.1 Project Description

HVJ Associates, Inc. was retained by AECOM to provide a geotechnical investigation for the dry berth of Battleship Texas in Houston, Texas. The project will involve conversion of the existing berth from wet to dry by constructing a wall or earthen embankment at the end of the existing slip. The ship will be supported on deep foundations beneath the keel, although a mat foundation option will also be considered. The investigation will be performed in two parts. Part 1 of our study is intended to provide the information needed to support preliminary design and cost estimates for the evaluation of a recommended design. Part 2 is intended to provide additional investigation needed to support detailed design of the selected alternative.

2.2 Scope of Work

The primary objectives of this study were to develop design and construction recommendations for the proposed battleship dry berth foundation. The objectives were accomplished by:

1. Drilling one 300-foot boring and two 120-foot borings on land; and three 150-foot borings in water to determine soil stratigraphy and to obtain samples for laboratory testing;

2. Obtaining four surface sediment samples within the slip for environmental analysis;

3. Installing two piezometers to monitor water levels adjacent to the slip and performing a slug test to assess the in situ hydraulic conductivity of the formation;

4. Performing laboratory tests to determine physical and engineering characteristics of the soils;

5. Performing engineering analyses to develop design guidelines and recommendations.

Subsequent sections of this report contain descriptions of the field exploration, laboratory-testing program, and general subsurface conditions. Design recommendations and construction considerations will be presented in a subsequent geotechnical design report.

3. FIELD INVESTIGATION

3.1 Geotechnical Borings

The subsurface stratigraphy at the project site was determined by drilling and sampling one 300-foot boring and two 120-foot borings on land; and three 150-foot borings in water. The borings were drilled at the approximate locations indicated on the plan of borings, Plate 2. The land borings were drilled using an all terrain mounted drilling equipment using dry and wet auger techniques. The water borings are drilled using a Jack up barge. The boring logs and a key to the soil classification and symbols are included in Appendix A.

3.2 Survey Data

Based on the survey information provided to us by AECOM, we have updated the survey information for all the borings. The table below contains the Northing, Easting and ground surface elevation for the borings.

TABLE 3-1: Boring Coordinates and Elevations

Boring No.	Northing (ft.)	Easting (ft.)	Local Coordinates Northing (ft.)	Local Coordinates Easting (ft.)	Ground Surface Elevation (ft.)	Drilling Depth (ft)
B-1	13844490.45	3209263.03	-399.24	-271.90	11.94	120
B-2	13844795.02	3209576.73	33.96	-212.68	4.34	120
B-3	13845133.25	3209111.90	13.7	-787.18	5.08	300
B-4	13844890.89	3209006.19	-242.29	-720.99	-21.5	150
B-5	13844706.54	3209478.02	-96.55	-235.84	-13.45	150
B-6	13844509.46	3209569.28	-195.46	-12.49	-16.51	150

3.3 Sampling Methods

Samples were obtained continuously to a depth of 10 feet and at 5-foot intervals thereafter to a depth of 200 feet and at 10-foot intervals thereafter to the termination depth of the borings. Cohesive soil samples were obtained using a three-inch thin-walled tube sampler in general accordance with ASTM D 1587. Each sample was removed from the sampler in the field, carefully examined and then classified by a HVJ Associates, Inc. geotechnical technician. The shear strength of cohesive soils was estimated by using a hand penetrometer in the field. Suitable portions of each sample were sealed and packaged for transport to our laboratory.

Cohesionless soils were sampled with the split spoon sampler in general accordance with ASTM D 1586. Driving resistances were recorded for each six-inch penetration and samples were visually classified and sealed and packaged for further testing in our laboratory.

3.4 Sediment Sampling for Environmental Parameters

On December 8, 2010, sediment samples were obtained at four locations adjacent to the battleship at the locations shown on Plate 2. Samples were collected using a "clam shell" sampling device which was lowered on a rope from the battleship deck bow area (sample BT1), stern area (sample BT2), port side (sample BT3) and starboard side (sample BT4). The sampling device was scrubbed and decontaminated with distilled water initially and between samplings. Samples were placed into pre-labeled laboratory-supplies glass jars, transferred to an insulated cooler on water ice and shipped under chain-of-custody to Anacon Laboratory for analysis. Samples were analyzed for the following parameters: 1) metals using EPA Method 6020; 2) pesticides using EPA Method 8181A; 3) semi-volatiles using EPA Method 8270A; 4) ammonia (as N) using EPA Method 350.3; 5) cyanide using method SM-4500 CN; 6) total organic carbon using EPA Method 9060; 7) total petroleum hydrocarbons using EPA Method 8021; and 8) percent solids. Results show that certain metals, semi-volatiles and ammonia are present above the analytical method detection limits. The table below summarizes the test results with measurements above detection limits:

TABLE 3-2: Summary of Environmental Test Results

Battleship Texas Sludge Sample Analytical Results Samples Collected on December 8, 2010 (results in parts per million or ppm unless otherwise noted)				
PARAMETER	**SAMPLE DESIGNATION AND LOCATION**			
	BT1 (BOW)	**BT2 (STERN)**	**BT3 (PORT)**	**EB4 (STARBOARD)**
METALS (6020)				
Arsenic	5.14	11.6	6.50	7.09
Cadmium	ND	0.47	0.47	0.38
Chromium, Total	16.6	19.1	18.9	16.6
Chromium, Trivalent	16.6	19.1	18.9	16.6
Copper	29.3	30.2	32.1	28.5
Lead	33.2	34.5	36.0	116
Mercury	0.46	ND	ND	ND
Nickel	14.9	17.5	16.3	14.5
Zinc	161	153	167	167
SEMI-VOLATILES (8270C)				
Diethyl Phthalate	0.499	0.205	0.202	0.255
Dibutylphthalate	0.813	0.340	0.345	0.313
Fluoranthene	0.031	0.443	0.045	0.022
Chrysene	ND	0.031	ND	ND
Bis (2-Ethylhexyl) Phthalate	0.265	0.305	0.183	ND
Benzo (b) Fluoranthene	0.030	0.063	0.055	ND
Benzo (k) Fluoranthene	ND	0.031	0.020	0.022
Benzo (a) Pyrene	0.044	0.046	ND	0.037
Benzo (ghi) Perylene	ND	0.021	0.020	ND
MISCELLANEOUS				
Ammonia (as N)	246	253	266	294
Percent Total Organic Carbon	**0.51**	**0.55**	**0.44**	**0.62**
Percent Solids	**28.0**	**31.8**	**30.3**	**26.7**

Table Notes: ND = not detected above the analytical method detection limit. **Results highlighted in bold are percentages.**

Copies of laboratory reports by Anacon as well as the standard chain-of-custody documentation are included in Appendix E.

3.5 Water Level Measurements

Groundwater level and depth of water at the time of drilling is recorded during the drilling operations and the water level measurements are presented on the boring logs presented in Appendix A.

4. LABORATORY TESTING

Selected soil samples were tested in the laboratory to estimate physical and engineering properties applicable to the site. All tests were performed according to the relevant ASTM Standards. These tests consisted of moisture content measurements, Atterberg limits, hand penetrometer, percent finer than No. 200 sieve, unconsolidated undrained (UU) compression, unconfined (UC) compression, consolidated undrained (CU) compression, consolidation and unit dry weight tests.

The Atterberg limits and percent passing No. 200 sieve tests were utilized to verify field classification by the Unified Soils Classification System. The compression tests were performed to obtain the shear strength parameters of the soil. The consolidated undrained (CU) test was performed to obtain the drained shear strength of the soil. Consolidation test was performed to estimate the foundation settlement.

The type and number of tests performed for this investigation are summarized below:

TABLE 4-1: Summary of Laboratory Tests

Type of Test	Number of Tests
Moisture Contents (ASTM D2216)	192
Atterberg Limits (ASTM D4318)	58
Percent Passing No. 200 Sieve (ASTM D1140)	51
Pocket Penetrometer	171
UC- Compression (ASTM D 2166)	9
UU- Compression (ASTM D 2850)	61
CU- Compression (ASTM D 4767)	7
Unit Dry Weight (ASTM D 2166)	70
Consolidation (ASTM D 2435)	6

The laboratory test results are presented on the boring logs presented in Appendix A. The consolidated undrained compression test results are presented in Appendix B. The consolidated undrained compression test results are presented in Appendix G and the consolidation test results are presented in Appendix H.

5. SITE CHARACTERIZATION

5.1 General Geology

There are two major surface geological formations that exist in the Houston area: the Beaumont formation and the Lissie formation. The Beaumont formation is a relatively younger formation generally found to the southeast of the Lissie formation. The Beaumont formation dips southeastward and extends beneath beach sand and waters of the Gulf of Mexico as far as the continental shelf. The project site is located in the Beaumont formation.

The Beaumont formation was deposited on land near sea level in flat river deltas and in inter-delta regions. Soil deposition occurred in fresh water streams and in flood plains (as backwater marsh and natural levees). The courses of major streams and deltaic tributaries changed frequently during the period of deposition, generating within the Beaumont clay a complex stratification of sand, silt and clay deposits. Frequently, stream courses were diverted significant distances from a given point in a backwater marsh, and the water overlying the soil would evaporate since it was cut off from a drainage path. Such water which would be highly alkaline, would precipitate large nodules of calcium carbonate (calcareous nodules) throughout the surface of evaporation. With the coming of the Second Wisconsin Ice Age, the nearby sea withdrew, leaving the formation several hundred feet above sea level and permitting the soil to desiccate. The process of desiccation compressed the clays in the formation such that they became significantly overconsolidated to a large depth. In addition to preconsolidating the soil, the process of desiccation, together with the later rewetting, produced a network of fissures and slickensides that are now closed but which represent potential planes of weakness in the soil.

5.2 Geologic Faulting

The tectonic history of the Texas Gulf Coast includes a relatively stable depositional cycle since the Cretaceous Period (about 65 million years). During this period the area has been subjected to deposition of clays, silts, and sands resulting in over 30 thousand feet of sedimentary rocks. Underlying this clastic sequence are salt formations, which have migrated upwards to produce the typical salt dome features associated with the Texas Gulf Coast. In conjunction with salt movement, dewatering and compaction of some of the deeper sediments in the basin have resulted in the development of growth faults.

A review of surface faults was made from geologic literature and available in-house records. The primary objective of this review was to evaluate available information from these reports concerning the presence of active faults in the project area. Based on our review, Deepwater fault is located at about 4 miles southwest of the project site, Battlegrounds fault is located about 2 miles southeast of the project site, and Wooster fault is located about 3 miles northeast of the project site. We do not anticipate faulting may impact the project site. However, it should be noted that unmapped faults that could impact the project may exist within the project area. A detailed fault study is beyond the scope of this study.

5.3 Soil Stratigraphy

Our interpretation of soil and water conditions along the project alignment is based on information obtained at the boring locations only. This information has been used as the basis for our conclusions and recommendations. Significant variations at areas not explored by the project borings may require reevaluation of our findings and conclusions.

The subsurface soils generally comprise of very soft to hard fat clays, sandy lean clays and lean clays to the termination depth of the borings. Subsurface profiles showing conditions at the site are shown in Plates 3A and 3B. Loose to very dense cohesionless clayey sands, silty sands, sandy silts and silts were encountered between elevations -6 feet and -11 feet in boring B-1; between elevations -4 feet and -9 feet, and between elevations -69 feet and -74 feet in boring B-2; between elevations -212 feet and -238 feet, and below elevation -283 feet in boring B-3; between elevations -64 feet and -74 feet, between elevations -84.5 feet to -89.5 feet and between elevations -134.5 feet and -139.5 feet in boring B-4. Fill material comprising of fat clay and sandy lean clay with shells and rocks was encountered between elevations +11 feet and -1 feet at boring locations B-1 and B-3. Ferrous and calcareous nodules were encountered at various depths in all the borings.

5.4 Ground Water

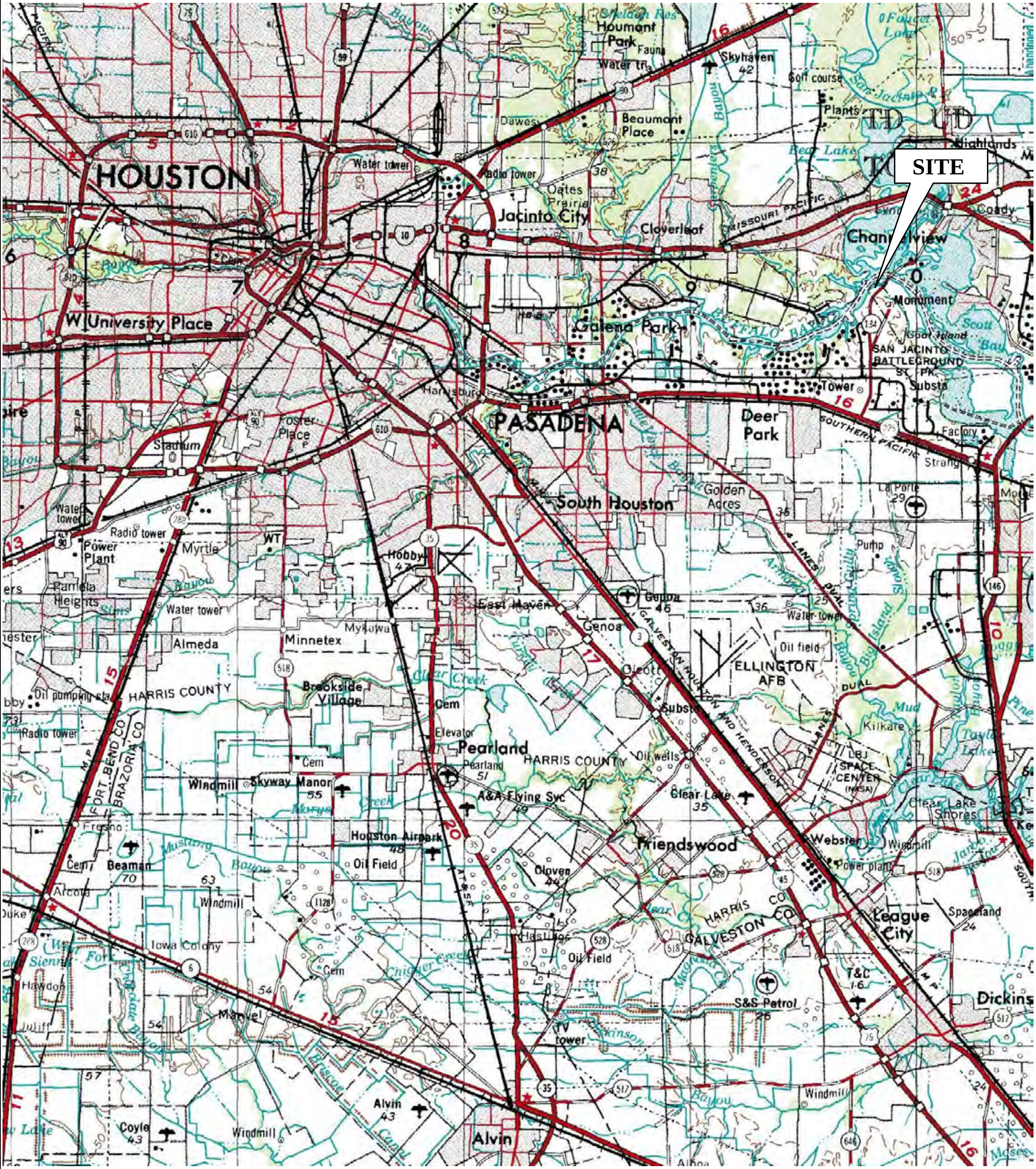
Groundwater was encountered at elevations ranging between -4 feet and 0 feet during the drilling operations. Two 40-foot piezometers were installed to monitor groundwater elevation behind the slope. Water level readings in the piezometers ranged between +0.74 feet and +1.47 feet. Piezometer installation report is presented in Appendix C.

A slug test was performed to measure hydraulic conductivity of the soils behind the slope. A description of the test procedure and test results is presented in Appendix F.

6. LIMITATIONS

This study was performed for the exclusive use of AECOM for proposed dry berth of Battleship Texas in Houston, Texas. HVJ Associates, Inc. has endeavored to comply with generally accepted geotechnical engineering practice common in the local area. HVJ Associates, Inc. makes no warranty, express or implied. The analyses and recommendations contained in this report are based on data obtained from subsurface exploration, laboratory testing, the project information provided to us and our experience with similar soils and site conditions. The methods used indicate subsurface conditions only at the specific locations where samples were obtained, only at the time they were obtained, and only to the depths penetrated. Samples cannot be relied on to accurately reflect the strata variations that usually exist between sampling locations. Should any subsurface conditions other than those described in our boring logs be encountered, HVJ Associates should be immediately notified so that further investigation and supplemental recommendations can be provided.

PLATES



N

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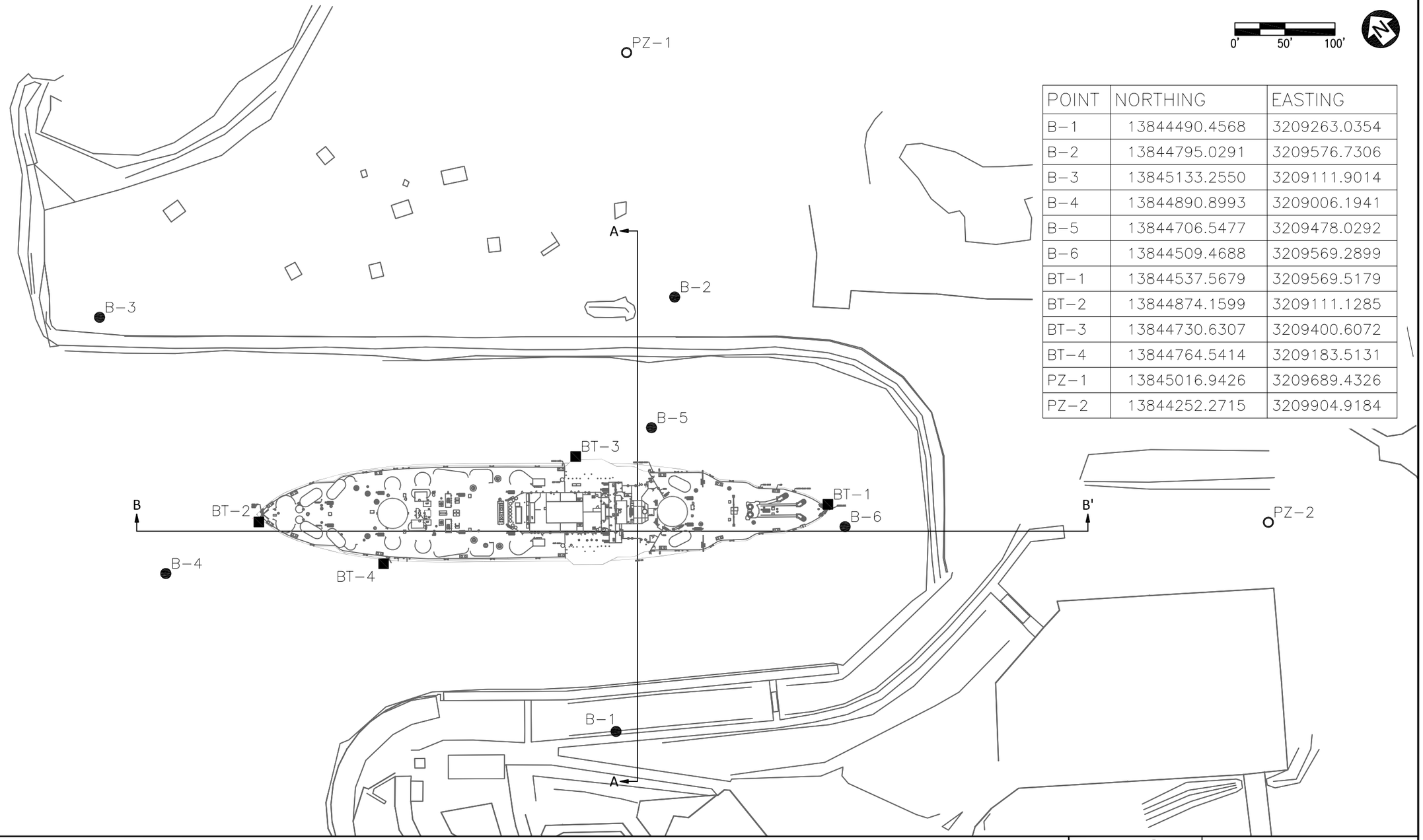
DATE: 02/24/2011	APPROVED BY: SV	PREPARED BY: NL

SITE VICINITY PLAN
BATTLESHIP TEXAS

PROJECT NO.:	DRAWING NO.:
HG1015021	PLATE 1



POINT	NORTHING	EASTING
B-1	13844490.4568	3209263.0354
B-2	13844795.0291	3209576.7306
B-3	13845133.2550	3209111.9014
B-4	13844890.8993	3209006.1941
B-5	13844706.5477	3209478.0292
B-6	13844509.4688	3209569.2899
BT-1	13844537.5679	3209569.5179
BT-2	13844874.1599	3209111.1285
BT-3	13844730.6307	3209400.6072
BT-4	13844764.5414	3209183.5131
PZ-1	13845016.9426	3209689.4326
PZ-2	13844252.2715	3209904.9184

LEGEND

- ● BORING
- ○ PIEZOMETER
- ■ ENVIRONMENTAL GRAB SAMPLE

SEE PLATES 3A & 3B FOR SECTION VIEWS

HVJ ASSOCIATES

SCALE: 1" = 100'

DATE: 2/25/2011

DRAWN BY:	PROJ. CHK:	APPRV. BY:
RJ	SV	MH

BATTLESHIP TEXAS
PLAN OF BORINGS

PROJECT NO.:	FILENAME:	
HG1015021	BATTLESHIP_BORING_LOGS	PLATE 2

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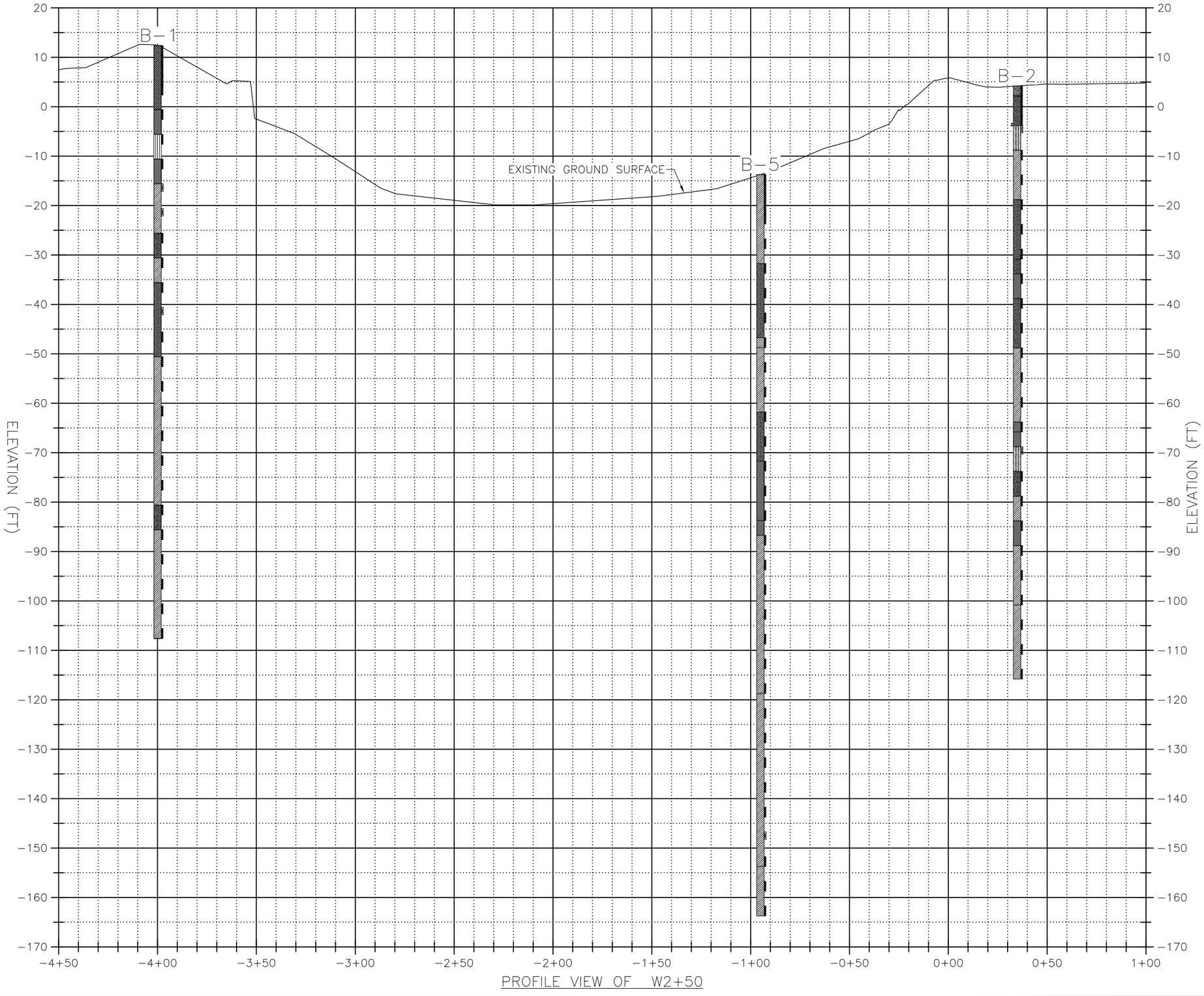

PROFILE VIEW OF W2+50

SOIL SYMBOLS

Soil Types

Clay | Silt | Sand | Fill

Modifiers

Clayey | Silty | Sandy Clay | Cemented

Construction Materials

Asphaltic Concrete | Stabilized Base | Fill or Debris | Base

SAMPLER TYPES

- Thin Walled Shelby Tube
- No Recovery
- Split Barrel
- Auger
- Liner Tube
- Jar Sample

HVJ ASSOCIATES

SCALE: 1" = 50'H 20'V		
DATE: 2/25/2011		
DRAWN BY: RJ	PROJ. CHK: SV	APPRV. BY: MH

BATTLESHIP TEXAS
PROFILE WITH BORING LOGS
ALIGNMENT "W2+50"
SECTION A-A'

PROJECT NO.: HG1015021	FILENAME: BATTLESHIP_BORING_LOGS	PLATE 3A

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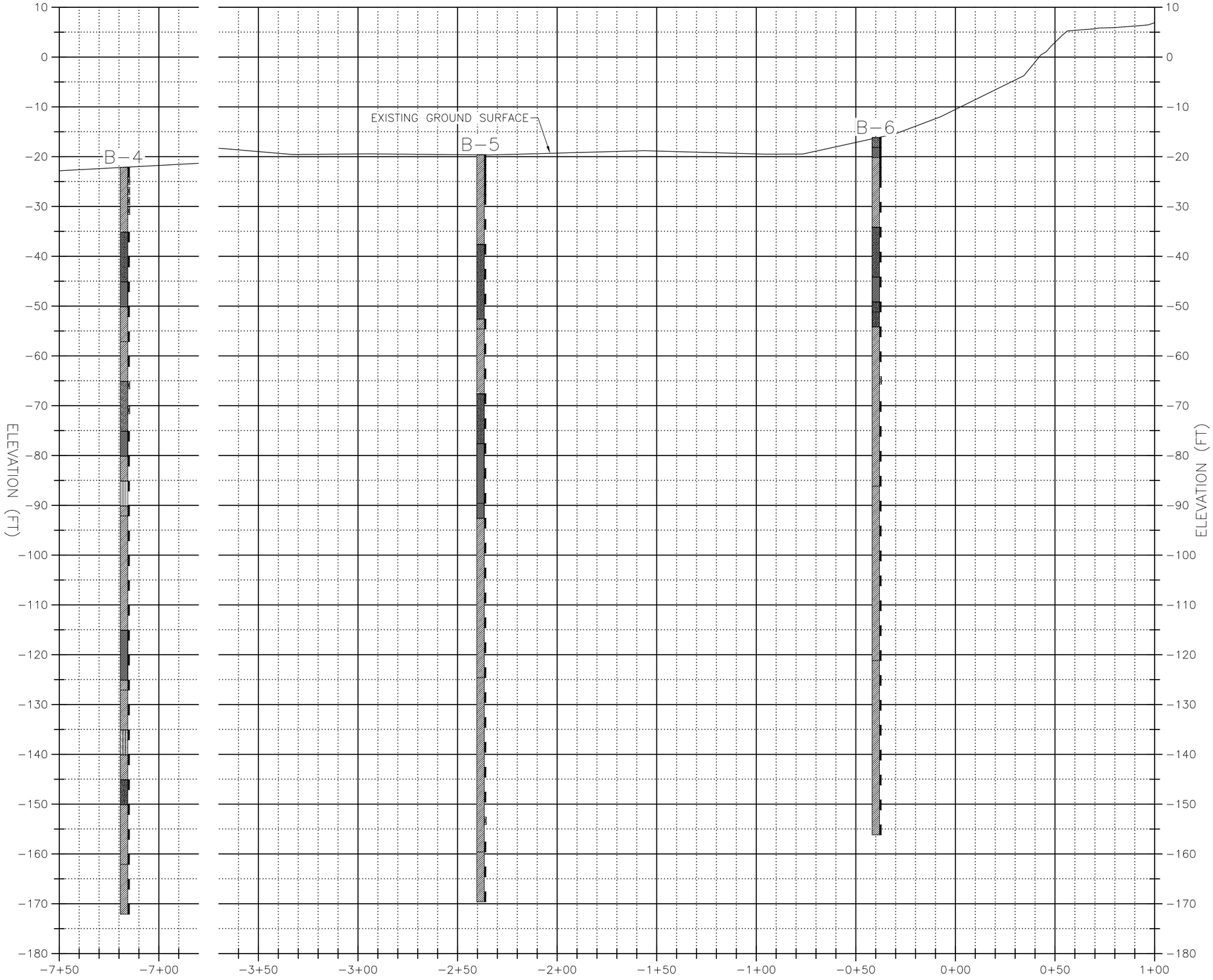

PROFILE VIEW OF S2+00

SOIL SYMBOLS

Soil Types

Clay | Silt | Sand | Fill

Modifiers

Clayey | Silty | Sandy Clay | Cemented

Construction Materials

Asphaltic Concrete | Stabilized Base | Fill or Debris | Base

SAMPLER TYPES

- Thin Walled Shelby Tube
- No Recovery
- Split Barrel
- Auger
- Liner Tube
- Jar Sample

HVJ ASSOCIATES	SCALE: 1" = 50'H 20'V		
	DATE: 2/25/2011		
	DRAWN BY: RJ	PROJ. CHK: SV	APPRV. BY: MH

BATTLESHIP TEXAS
PROFILE WITH BORING LOGS
ALIGNMENT "S2+00"
SECTION B-B'

PROJECT NO.:	FILENAME:	
HG1015021	BATTLESHIP_BORING_LOGS	PLATE 3B

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APPENDIX A

BORING LOGS AND KEY TO TERMS & SYMBOLS

LOG OF BORING

Project: Battleship Texas
Project No.: HG1015021
Boring No.: B-1
Date: 11/18/2010
Elevation: 11.94 feet
Groundwater during drilling: ---
Northing: 13,844,490.5
Local Coord. Northing: -399.24
Groundwater after drilling: ---
Easting: 3,209,263.0
Local Coord. Easting: -271.90

ELEV. DEPTH, FEET	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	SOIL/ROCK CLASSIFICATION	% PASSING NO. 200 SIEVE	DRY DENSITY PCF
0		FILL: Dark gray and brown fat clay -w/ rocks, shells and calcareous nodules		
10				
5				95
5			85	
10				94
0				
15		Very stiff brown and gray LEAN CLAY (CL)		
-5				
20		Brown and gray SANDY SILT (ML) -w/ clay inclusions	52	
-10				
25		Stiff brown and gray LEAN CLAY WITH SAND (CL)	83	
-15				
30	15-19-13	Very stiff to hard brown and gray FAT CLAY (CH)		
-20				
35	13-11-14		94	

SHEAR STRENGTH, TSF
0.5 1.0 1.5 2.0
MOISTURE ○ CONTENT, %
PLASTIC LIMIT — LIQUID LIMIT
10 20 30 40 50 60 70 80 90

Shear Types: ● = Hand Penet. ■ = Torvane ▲ = Unconf. Comp. ✳ = UU Triaxial

See Plate 2 for boring location.

PLATE A-1a

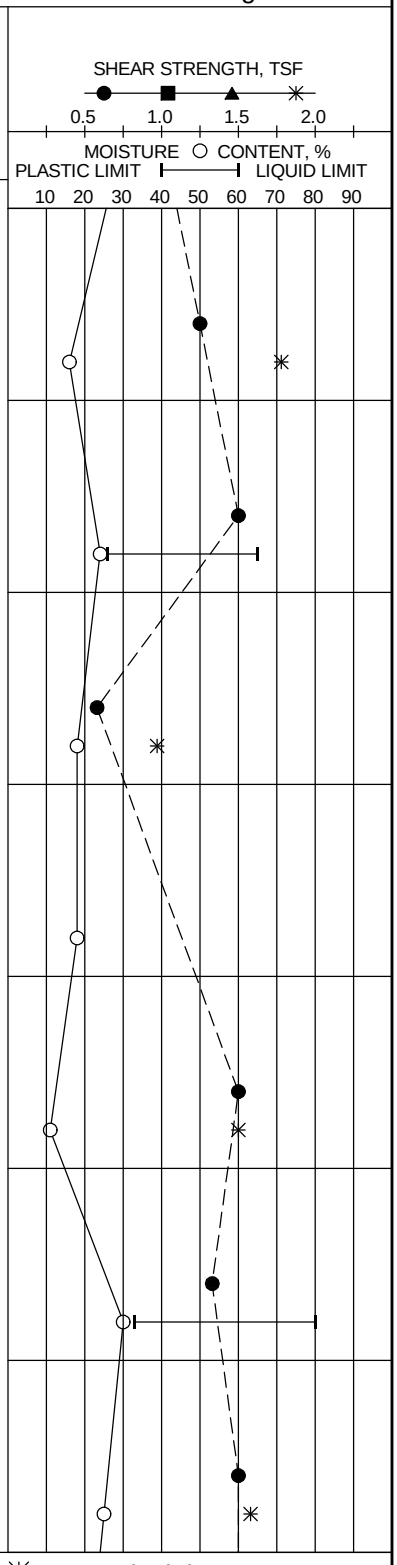
LOG OF SOIL BORING HG-10-15021.GPJ HVJ.GDT 12/29/10

HVJ ASSOCIATES

LOG OF BORING

Project: Battleship Texas
Project No.: HG1015021
Boring No.: B-1
Date: 11/18/2010
Elevation: 11.94 feet
Groundwater during drilling: ---
Northing: 13,844,490.5
Local Coord. Northing: -399.24
Groundwater after drilling: ---
Easting: 3,209,263.0
Local Coord. Easting: -271.90

ELEV. DEPTH, FEET	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	SOIL/ROCK CLASSIFICATION	% PASSING NO. 200 SIEVE	DRY DENSITY PCF
-25 to -30		Very stiff to hard brown and gray FAT CLAY (CH)		
-30 to -40		Very stiff brown SANDY LEAN CLAY (CL) -w/ calcareous nodules 38'-40'		105
-40 to -45		Very stiff reddish brown and gray FAT CLAY (CH) -w/ claystone 43'-45'		
-45 to -55	21-34-46	Stiff to hard reddish brown and gray SANDY LEAN CLAY (CL)	59	115
-55 to -70		Very stiff gray and reddish brown FAT CLAY (CH)		112 94



Shear Types: ● = Hand Penet. ■ = Torvane ▲ = Unconf. Comp. ✳ = UU Triaxial

See Plate 2 for boring location.

PLATE A-1b

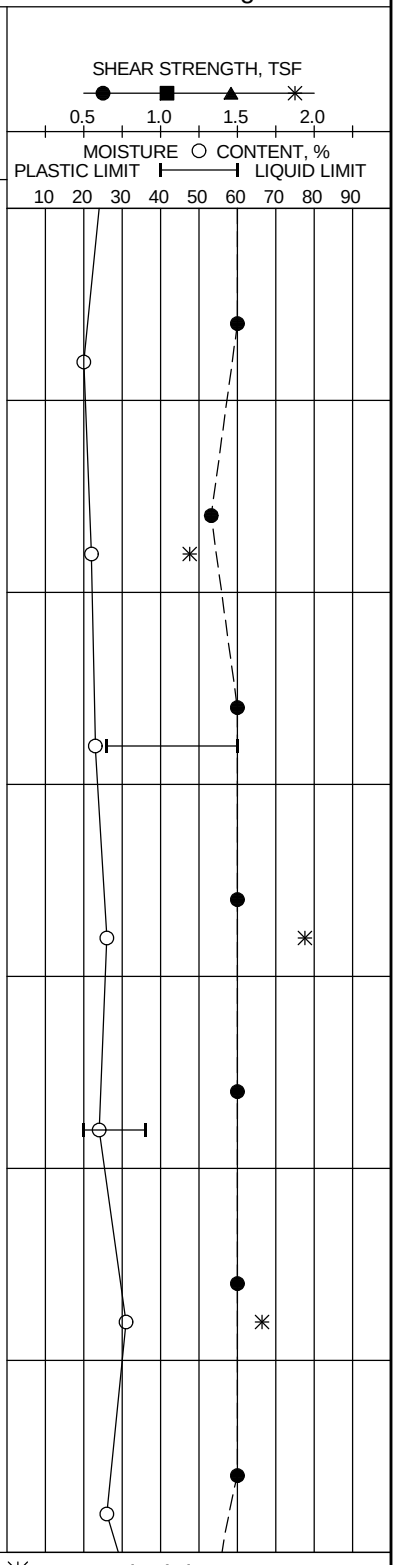
LOG OF SOIL BORING HG-10-15021.GPJ HVJ.GDT 12/29/10

HVJ ASSOCIATES

LOG OF BORING

Project: Battleship Texas
Project No.: HG1015021
Boring No.: B-1
Date: 11/18/2010
Elevation: 11.94 feet
Groundwater during drilling: ---
Northing: 13,844,490.5
Local Coord. Northing: -399.24
Groundwater after drilling: ---
Easting: 3,209,263.0
Local Coord. Easting: -271.90

ELEV. DEPTH, FEET	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	SOIL/ROCK CLASSIFICATION	% PASSING NO. 200 SIEVE	DRY DENSITY PCF
70 / -60		Very stiff gray and reddish brown FAT CLAY (CH)		
75 / -65		-w/ sand pockets 78'-80'		99
80 / -70				
85 / -75				91
90 / -80		Very stiff reddish brown SANDY LEAN CLAY (CL)		
95 / -85		Stiff to very stiff reddish brown and gray FAT CLAY (CH)		87
100 / -90				
105				



Shear Types: ● = Hand Penet. ■ = Torvane ▲ = Unconf. Comp. ✳ = UU Triaxial

See Plate 2 for boring location.

PLATE A-1c

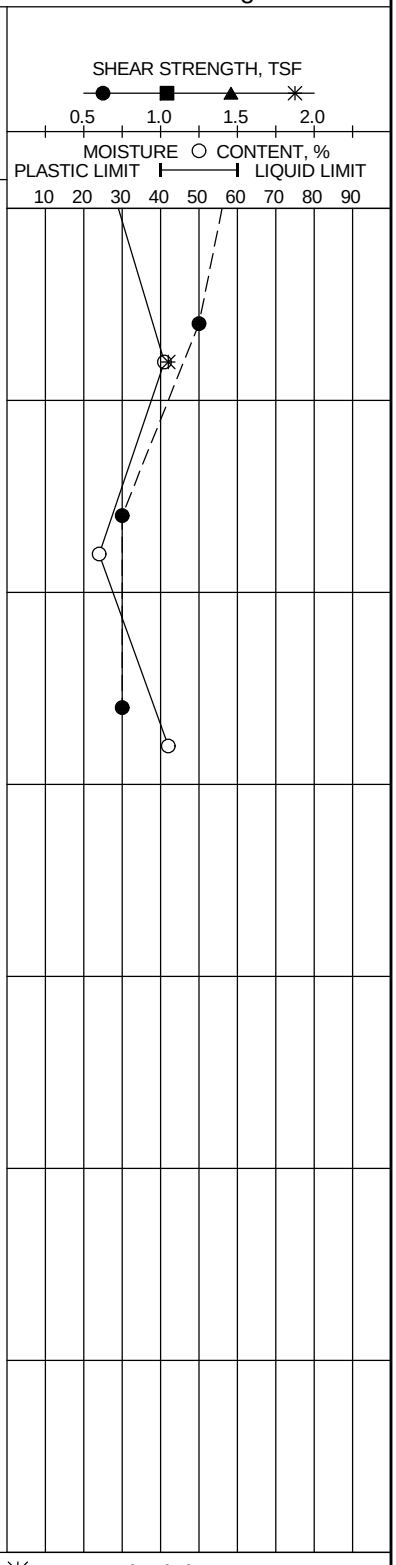
LOG OF SOIL BORING HG-10-15021.GPJ HVJ.GDT 12/29/10

HVJ ASSOCIATES

LOG OF BORING

Project: Battleship Texas
Project No.: HG1015021
Boring No.: B-1
Date: 11/18/2010
Elevation: 11.94 feet
Groundwater during drilling: ---
Northing: 13,844,490.5
Local Coord. Northing: -399.24
Groundwater after drilling: ---
Easting: 3,209,263.0
Local Coord. Easting: -271.90

ELEV. DEPTH, FEET	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	SOIL/ROCK CLASSIFICATION	% PASSING NO. 200 SIEVE	DRY DENSITY PCF
105 (-95)		Stiff to very stiff reddish brown and gray FAT CLAY (CH)		
110 (-100)		-w/ sand seams 108'-110'		84
115 (-105)		-w/ sand seams 113'-115'	97	
120 (-110)		-w/ sand seams 118'-120'		
125 (-115)				
130 (-120)				
135 (-125)				
140				



Shear Types: ● = Hand Penet. ■ = Torvane ▲ = Unconf. Comp. ✳ = UU Triaxial

See Plate 2 for boring location.

PLATE A-1d

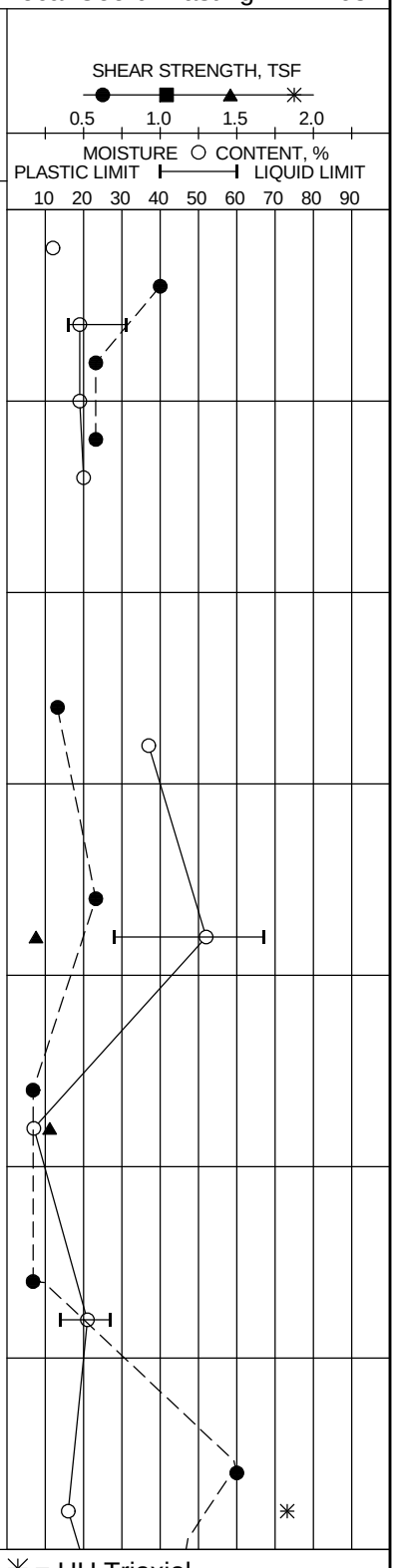
LOG OF SOIL BORING HG-10-15021.GPJ HVJ.GDT 12/29/10

HVJ ASSOCIATES

LOG OF BORING

Project: Battleship Texas
Project No.: HG1015021
Boring No.: B-2
Date: 11/17/2010
Elevation: 4.34 feet
Groundwater during drilling: 8 feet
Northing: 13,844,795.0
Local Coord. Northing: 33.96
Groundwater after drilling: ---
Easting: 3,209,576.7
Local Coord. Easting: -212.68

ELEV. DEPTH, FEET	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	SOIL/ROCK CLASSIFICATION	% PASSING NO. 200 SIEVE	DRY DENSITY PCF
0 / 0		Brown CLAYEY SAND (SC)	19	
5 / -5	5-5-4	Stiff brown and gray SANDY LEAN CLAY (CL)	50	
10 / -10		Loose brown SILTY SAND (SM)	28	
15 / -15		Very soft to firm dark gray FAT CLAY (CH)		67
20 / -20		Very soft to very stiff brown and gray SANDY LEAN CLAY (CL)		119
25 / -25				
30 / -30				108
35				



Shear Types: ● = Hand Penet. ■ = Torvane ▲ = Unconf. Comp. ✳ = UU Triaxial

See Plate 2 for boring location.

PLATE A-2a

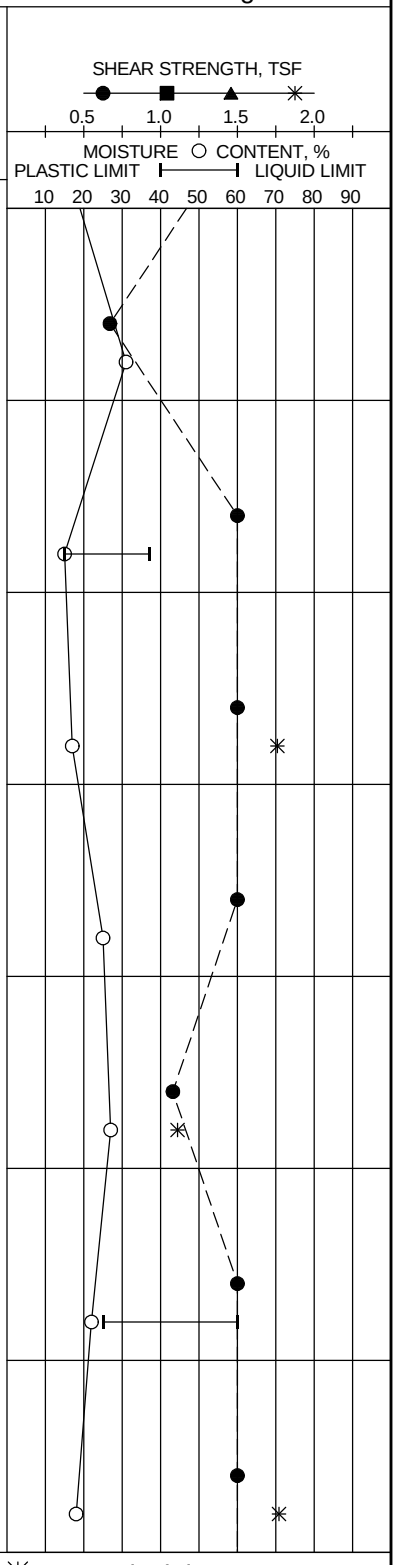
LOG OF SOIL BORING HG-10-15021.GPJ HVJ.GDT 12/29/10

HVJ ASSOCIATES

LOG OF BORING

Project: Battleship Texas
Project No.: HG1015021
Boring No.: B-2
Date: 11/17/2010
Elevation: 4.34 feet
Groundwater during drilling: 8 feet
Northing: 13,844,795.0
Local Coord. Northing: 33.96
Groundwater after drilling: ---
Easting: 3,209,576.7
Local Coord. Easting: -212.68

ELEV. DEPTH, FEET	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	SOIL/ROCK CLASSIFICATION	% PASSING NO. 200 SIEVE	DRY DENSITY PCF
35 / 40		Very soft to very stiff brown and gray SANDY LEAN CLAY (CL)		
-35 / 40		Stiff reddish brown LEAN CLAY (CL)	95	
-40 / 45		Very stiff brown and gray SANDY LEAN CLAY (CL)		107
-45 / 50				
-50 / 55		Very stiff reddish brown FAT CLAY (CH)	94	
-55 / 60				100
-60 / 65				
-65 / 70		Very stiff reddish brown LEAN CLAY (CL)		103



Shear Types: ● = Hand Penet. ■ = Torvane ▲ = Unconf. Comp. ✳ = UU Triaxial

See Plate 2 for boring location.

PLATE A-2b

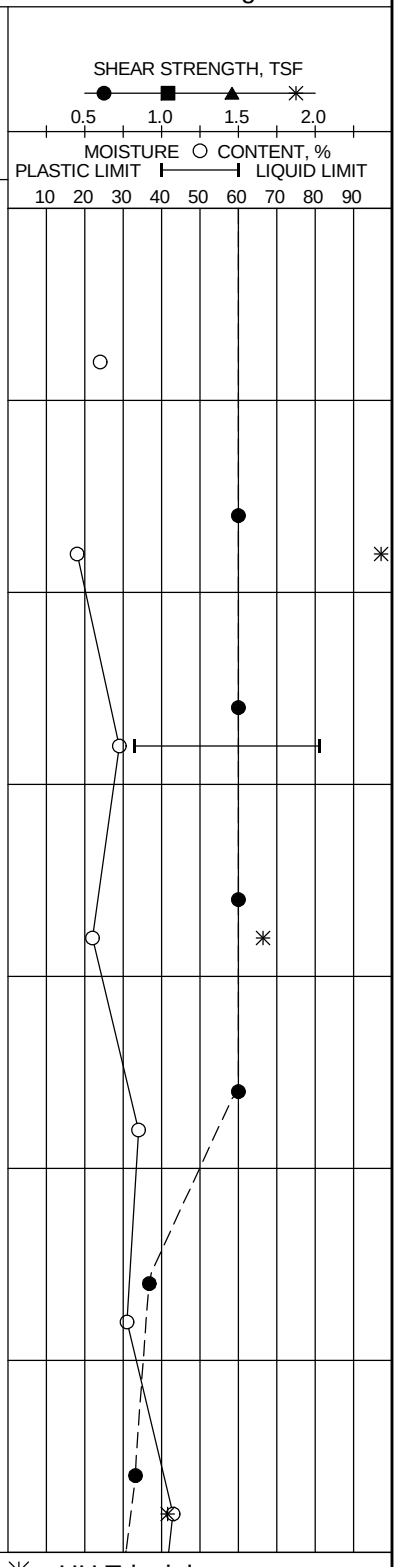
LOG OF SOIL BORING HG-10-15021.GPJ HVJ.GDT 12/29/10

HVJ ASSOCIATES

LOG OF BORING

Project: Battleship Texas
Project No.: HG1015021
Boring No.: B-2
Date: 11/17/2010
Elevation: 4.34 feet
Groundwater during drilling: 8 feet
Northing: 13,844,795.0
Local Coord. Northing: 33.96
Groundwater after drilling: ---
Easting: 3,209,576.7
Local Coord. Easting: -212.68

ELEV. DEPTH, FEET	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	SOIL/ROCK CLASSIFICATION	% PASSING NO. 200 SIEVE	DRY DENSITY PCF
-70 / 70	50/3-50/4	Very stiff reddish brown LEAN CLAY (CL)		
-70 / 75		Very dense brown SANDY SILT (SM)	15	
-75 / 80		Very stiff to hard reddish brown SANDY LEAN CLAY (CL)		105
-80 / 85		Very stiff reddish brown FAT CLAY (CH)		
-85 / 90		Very stiff brown LEAN CLAY (CL)		106
-90 / 95		Stiff to very stiff gray FAT CLAY (CH)		
-95 / 100		-w/ silt seams and shells 98'-100'	97	
-100 / 105		-w/ silt seams 103'-105'		76



Shear Types: ● = Hand Penet. ■ = Torvane ▲ = Unconf. Comp. ✳ = UU Triaxial

See Plate 2 for boring location.

PLATE A-2c

LOG OF SOIL BORING HG-10-15021.GPJ HVJ.GDT 12/29/10

HVJ ASSOCIATES

LOG OF BORING

Project: Battleship Texas
Project No.: HG1015021
Boring No.: B-2
Date: 11/17/2010
Elevation: 4.34 feet
Groundwater during drilling: 8 feet
Northing: 13,844,795.0
Local Coord. Northing: 33.96
Groundwater after drilling: ---
Easting: 3,209,576.7
Local Coord. Easting: -212.68

ELEV. DEPTH, FEET	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	SOIL/ROCK CLASSIFICATION	% PASSING NO. 200 SIEVE	DRY DENSITY PCF
105 / -105		Stiff to very stiff gray FAT CLAY (CH)		
110 / -110		-w/ silt seams 113'-115'		76
115 / -115		-w/ silt 118'-120'	97	
120 / -120				
125 / -125				
130 / -130				
135 / -135				
140				

SHEAR STRENGTH, TSF
0.5 1.0 1.5 2.0
MOISTURE ○ CONTENT, %
PLASTIC LIMIT — LIQUID LIMIT
10 20 30 40 50 60 70 80 90

Shear Types: ● = Hand Penet. ■ = Torvane ▲ = Unconf. Comp. ✳ = UU Triaxial

See Plate 2 for boring location.

PLATE A-2d

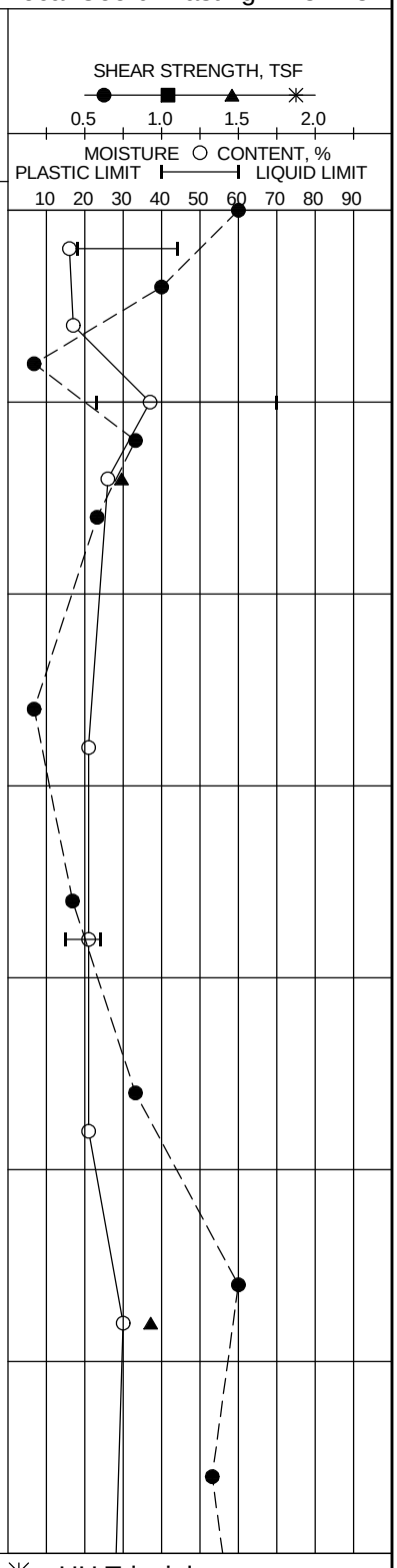
LOG OF SOIL BORING HG-10-15021.GPJ HVJ.GDT 12/29/10

HVJ ASSOCIATES

LOG OF BORING

Project: Battleship Texas
Project No.: HG1015021
Boring No.: B-3
Date: 11/22/2010
Elevation: 5.08 feet
Groundwater during drilling: 5 feet
Northing: 13,845,133.3
Local Coord. Northing: 13.7
Groundwater after drilling: ---
Easting: 3,209,111.9
Local Coord. Easting: -787.18

ELEV. DEPTH, FEET	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	SOIL/ROCK CLASSIFICATION	% PASSING NO. 200 SIEVE	DRY DENSITY PCF
5 — 0		FILL: Dark gray sandy lean clay -w/ rocks and shells		
0 — 5		FILL: Dark gray fat clay -w/ rocks	67	
		Stiff brown and gray FAT CLAY (CH)		96
-5 — 10				
		Soft to stiff gray and reddish brown SANDY LEAN CLAY (CL)	60	
-10 — 15				
		-w/ sand layer at 20'		
-15 — 20				
		-w/ sand seams 23'-15'	67	
-20 — 25				
		Stiff to very stiff reddish brown FAT CLAY (CH)		90
-25 — 30				
-30 — 35				



Shear Types: ● = Hand Penet. ■ = Torvane ▲ = Unconf. Comp. ✳ = UU Triaxial

See Plate 2 for boring location.

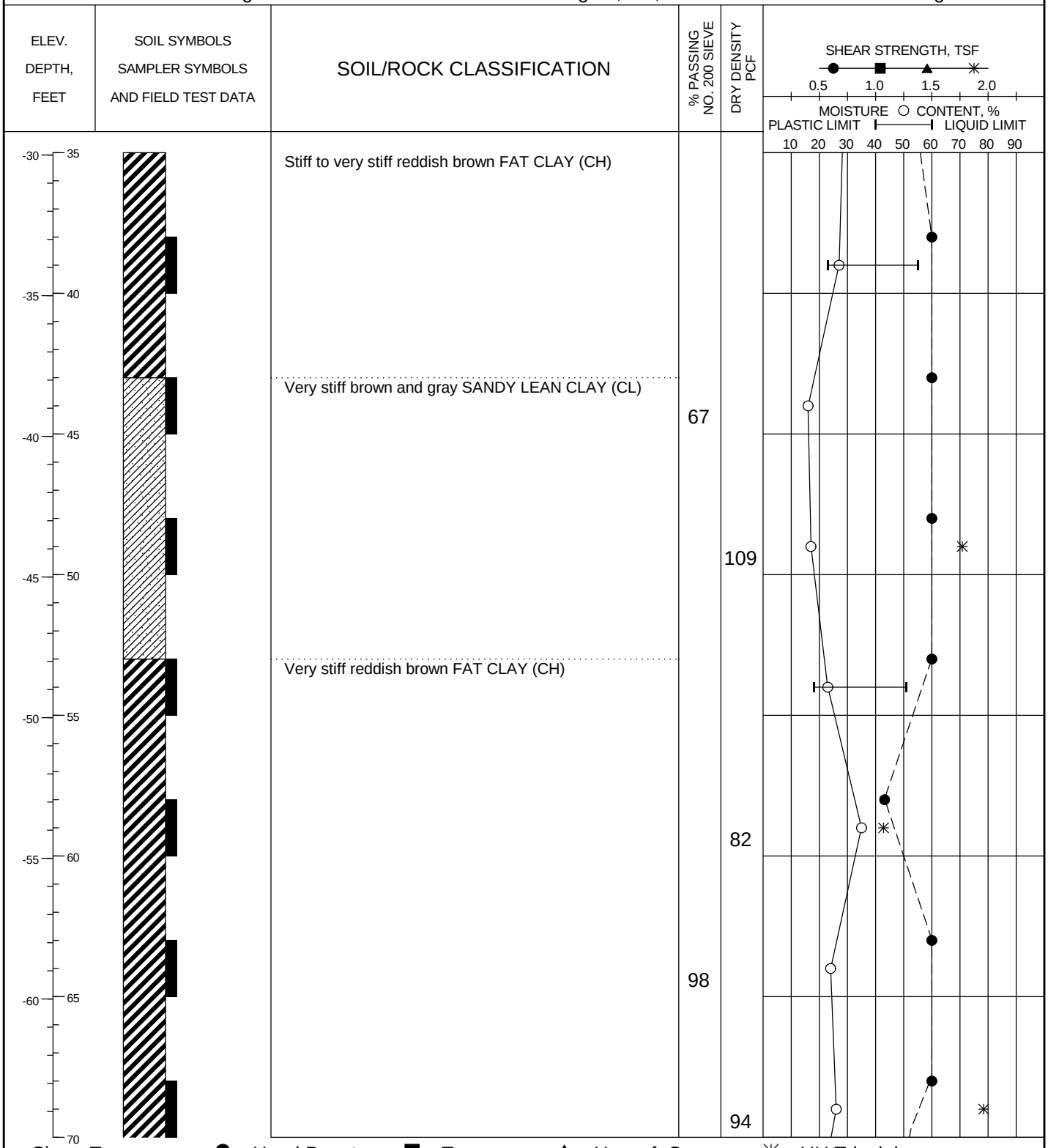
PLATE A-3a

LOG OF SOIL BORING HG-10-15021.GPJ HVJ.GDT 12/29/10

HVJ ASSOCIATES

LOG OF BORING

Project: Battleship Texas
Project No.: HG1015021
Boring No.: B-3
Date: 11/22/2010
Elevation: 5.08 feet
Groundwater during drilling: 5 feet
Northing: 13,845,133.3
Local Coord. Northing: 13.7
Groundwater after drilling: ---
Easting: 3,209,111.9
Local Coord. Easting: -787.18



Shear Types: ● = Hand Penet. ■ = Torvane ▲ = Unconf. Comp. ✳ = UU Triaxial

See Plate 2 for boring location.

PLATE A-3b

LOG OF SOIL BORING HG-10-15021.GPJ HVJ.GDT 12/29/10

HVJ ASSOCIATES

LOG OF BORING

Project: Battleship Texas
Project No.: HG1015021
Boring No.: B-3
Date: 11/22/2010
Elevation: 5.08 feet
Groundwater during drilling: 5 feet
Northing: 13,845,133.3
Local Coord. Northing: 13.7
Groundwater after drilling: ---
Easting: 3,209,111.9
Local Coord. Easting: -787.18

ELEV. DEPTH, FEET	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	SOIL/ROCK CLASSIFICATION	% PASSING NO. 200 SIEVE	DRY DENSITY PCF
-65 — 70		Very stiff reddish brown FAT CLAY (CH)		
-70 — 75		Stiff to very stiff reddish brown SANDY LEAN CLAY (CL)		100
-75 — 80				
-80 — 85				103
-85 — 90				
-90 — 95		Firm to hard reddish brown and gray FAT CLAY (CH)		
-95 — 100		-w/ sand seams 98'-120'	99	
105				89

SHEAR STRENGTH, TSF
0.5 1.0 1.5 2.0
MOISTURE ○ CONTENT, %
PLASTIC LIMIT — LIQUID LIMIT
10 20 30 40 50 60 70 80 90

Shear Types: ● = Hand Penet. ■ = Torvane ▲ = Unconf. Comp. ✳ = UU Triaxial

See Plate 2 for boring location.

PLATE A-3c

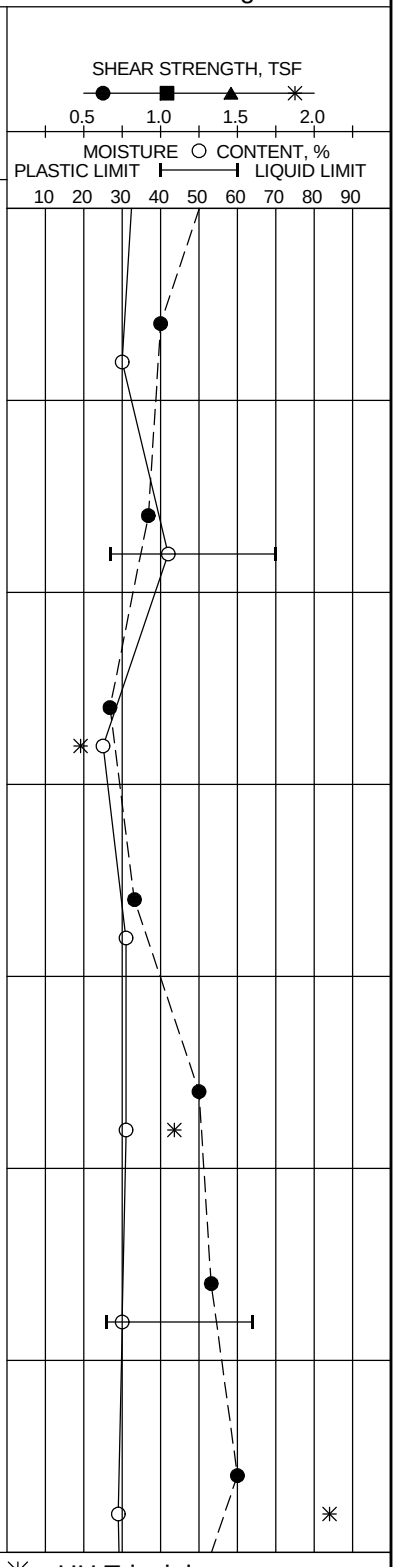
LOG OF SOIL BORING HG-10-15021.GPJ HVJ.GDT 12/29/10

HVJ ASSOCIATES

LOG OF BORING

Project: Battleship Texas
Project No.: HG1015021
Boring No.: B-3
Date: 11/22/2010
Elevation: 5.08 feet
Groundwater during drilling: 5 feet
Northing: 13,845,133.3
Local Coord. Northing: 13.7
Groundwater after drilling: ---
Easting: 3,209,111.9
Local Coord. Easting: -787.18

ELEV. DEPTH, FEET	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	SOIL/ROCK CLASSIFICATION	% PASSING NO. 200 SIEVE	DRY DENSITY PCF
-100 105 -105 110 -110 115 -115 120 -120 125 -125 130 -130 135 140		Firm to hard reddish brown and gray FAT CLAY (CH)		
		-w/ sandstone 123'-125'	95	86 95 93



Shear Types: ● = Hand Penet. ■ = Torvane ▲ = Unconf. Comp. ✳ = UU Triaxial

See Plate 2 for boring location.

PLATE A-3d

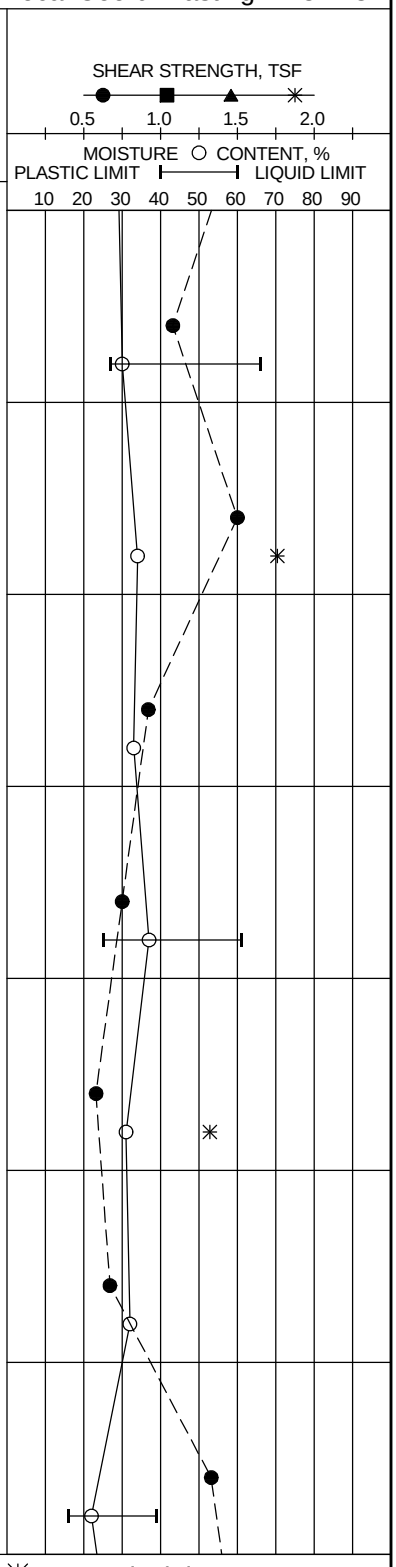
LOG OF SOIL BORING HG-10-15021.GPJ HVJ.GDT 12/29/10

HVJ ASSOCIATES

LOG OF BORING

Project: Battleship Texas
Project No.: HG1015021
Boring No.: B-3
Date: 11/22/2010
Elevation: 5.08 feet
Groundwater during drilling: 5 feet
Northing: 13,845,133.3
Local Coord. Northing: 13.7
Groundwater after drilling: ---
Easting: 3,209,111.9
Local Coord. Easting: -787.18

ELEV. DEPTH, FEET	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	SOIL/ROCK CLASSIFICATION	% PASSING NO. 200 SIEVE	DRY DENSITY PCF
-135 — 140		Firm to hard reddish brown and gray FAT CLAY (CH)		
		-w/ sand seams 143'-145'		88
-140 — 145				
-145 — 150				
		-w/ sand 153'-155'	91	
-150 — 155				
		-w/ sand seams 158'-160'		
-155 — 160				
-160 — 165				85
			97	
-165 — 170		Very stiff gray SANDY LEAN CLAY (CL) -w/ sandstone 143'-145'		
175				



Shear Types: ● = Hand Penet. ■ = Torvane ▲ = Unconf. Comp. ✳ = UU Triaxial

See Plate 2 for boring location.

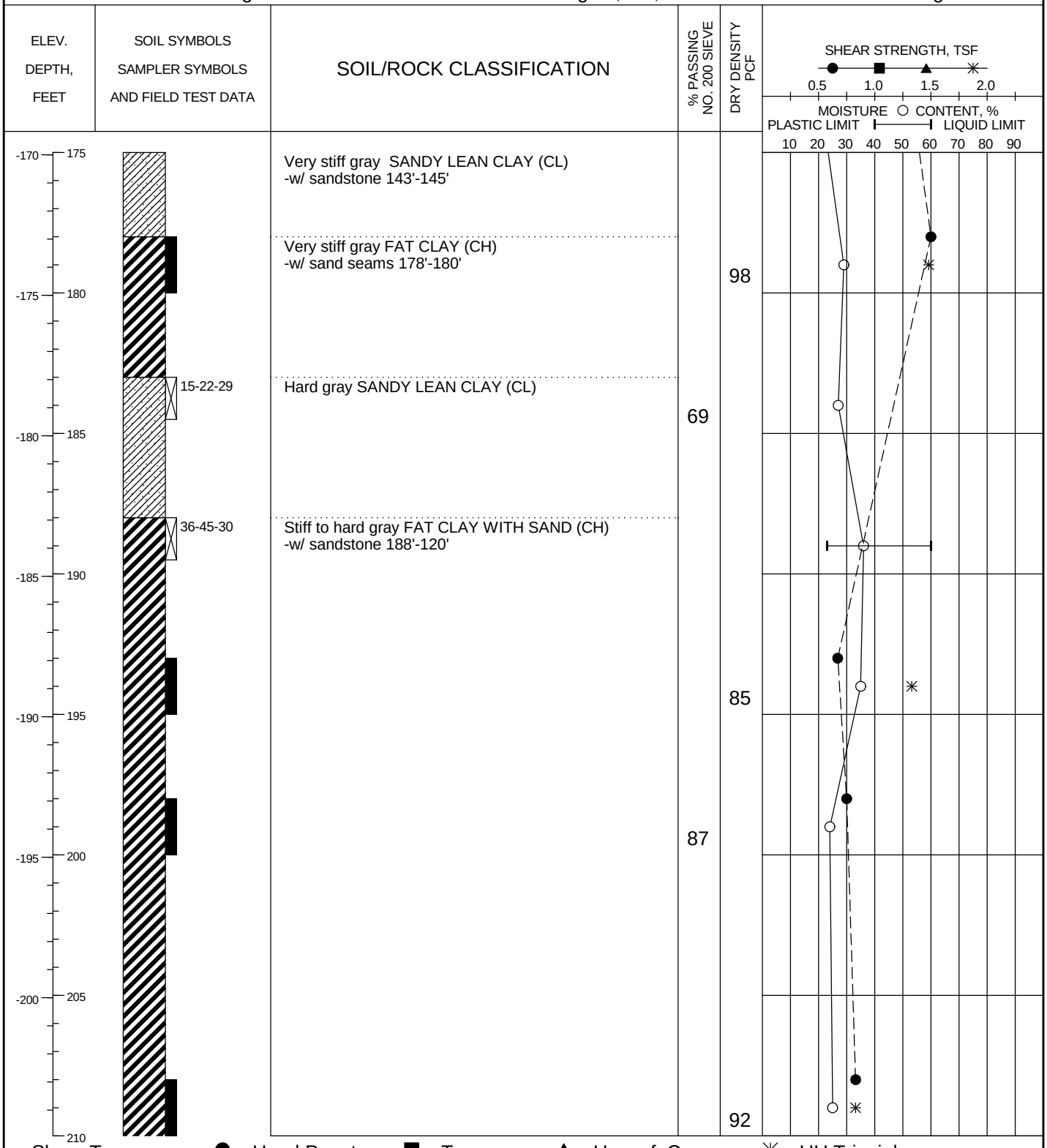
PLATE A-3e

LOG OF SOIL BORING HG-10-15021.GPJ HVJ.GDT 12/29/10

HVJ ASSOCIATES

LOG OF BORING

Project: Battleship Texas
Project No.: HG1015021
Boring No.: B-3
Date: 11/22/2010
Elevation: 5.08 feet
Groundwater during drilling: 5 feet
Northing: 13,845,133.3
Local Coord. Northing: 13.7
Groundwater after drilling: ---
Easting: 3,209,111.9
Local Coord. Easting: -787.18



Shear Types: ● = Hand Penet. ■ = Torvane ▲ = Unconf. Comp. ✳ = UU Triaxial

See Plate 2 for boring location.

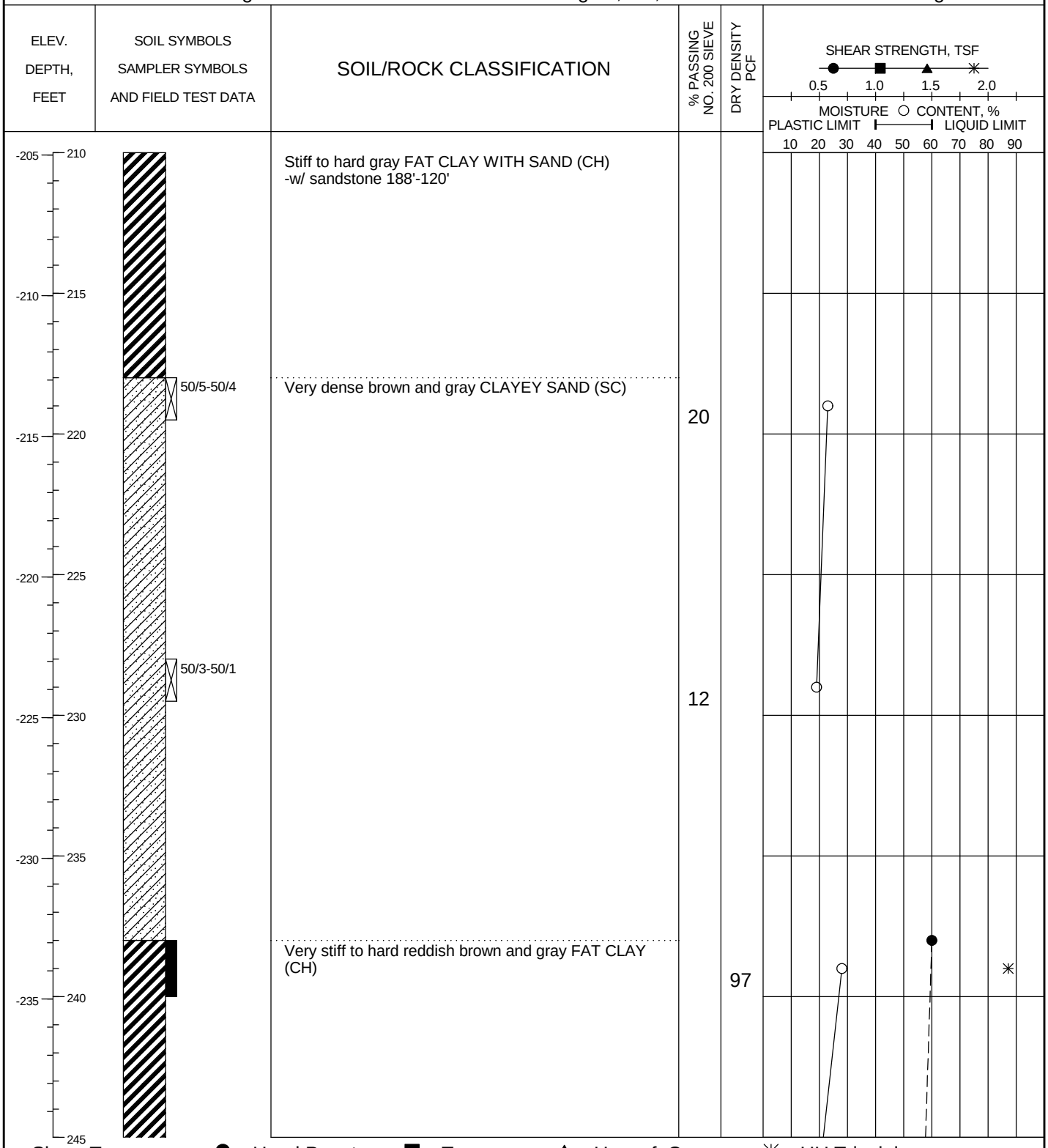
PLATE A-3f

LOG OF SOIL BORING HG-10-15021.GPJ HVJ.GDT 12/29/10

HVJ ASSOCIATES

LOG OF BORING

Project: Battleship Texas
Project No.: HG1015021
Boring No.: B-3
Date: 11/22/2010
Elevation: 5.08 feet
Groundwater during drilling: 5 feet
Northing: 13,845,133.3
Local Coord. Northing: 13.7
Groundwater after drilling: ---
Easting: 3,209,111.9
Local Coord. Easting: -787.18



Shear Types: ● = Hand Penet. ■ = Torvane ▲ = Unconf. Comp. ✳ = UU Triaxial

See Plate 2 for boring location.

PLATE A-3g

LOG OF SOIL BORING HG-10-15021.GPJ HVJ.GDT 12/29/10

HVJ ASSOCIATES

LOG OF BORING

Project: Battleship Texas
Project No.: HG1015021
Boring No.: B-3
Date: 11/22/2010
Elevation: 5.08 feet
Groundwater during drilling: 5 feet
Northing: 13,845,133.3
Local Coord. Northing: 13.7
Groundwater after drilling: ---
Easting: 3,209,111.9
Local Coord. Easting: -787.18

ELEV. DEPTH, FEET	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	SOIL/ROCK CLASSIFICATION	% PASSING NO. 200 SIEVE	DRY DENSITY PCF
-240 — 245		Very stiff to hard reddish brown and gray FAT CLAY (CH)		
-245 — 250		Very stiff reddish brown and gray SANDY LEAN CLAY (CL)		
-250 — 255		Very stiff to hard brown and gray FAT CLAY (CH) -w/ calcareous nodules 258'-260'		101
-255 — 260				
-260 — 265		-w/ sandstone 268'-270'		
-265 — 270				
-270 — 275		Very stiff to hard brown SANDY LEAN CLAY (CL)		110
280				

SHEAR STRENGTH, TSF
0.5 1.0 1.5 2.0
MOISTURE ○ CONTENT, %
PLASTIC LIMIT — LIQUID LIMIT
10 20 30 40 50 60 70 80 90

3.29 ✳
3.39 ✳

Shear Types: ● = Hand Penet. ■ = Torvane ▲ = Unconf. Comp. ✳ = UU Triaxial

See Plate 2 for boring location.

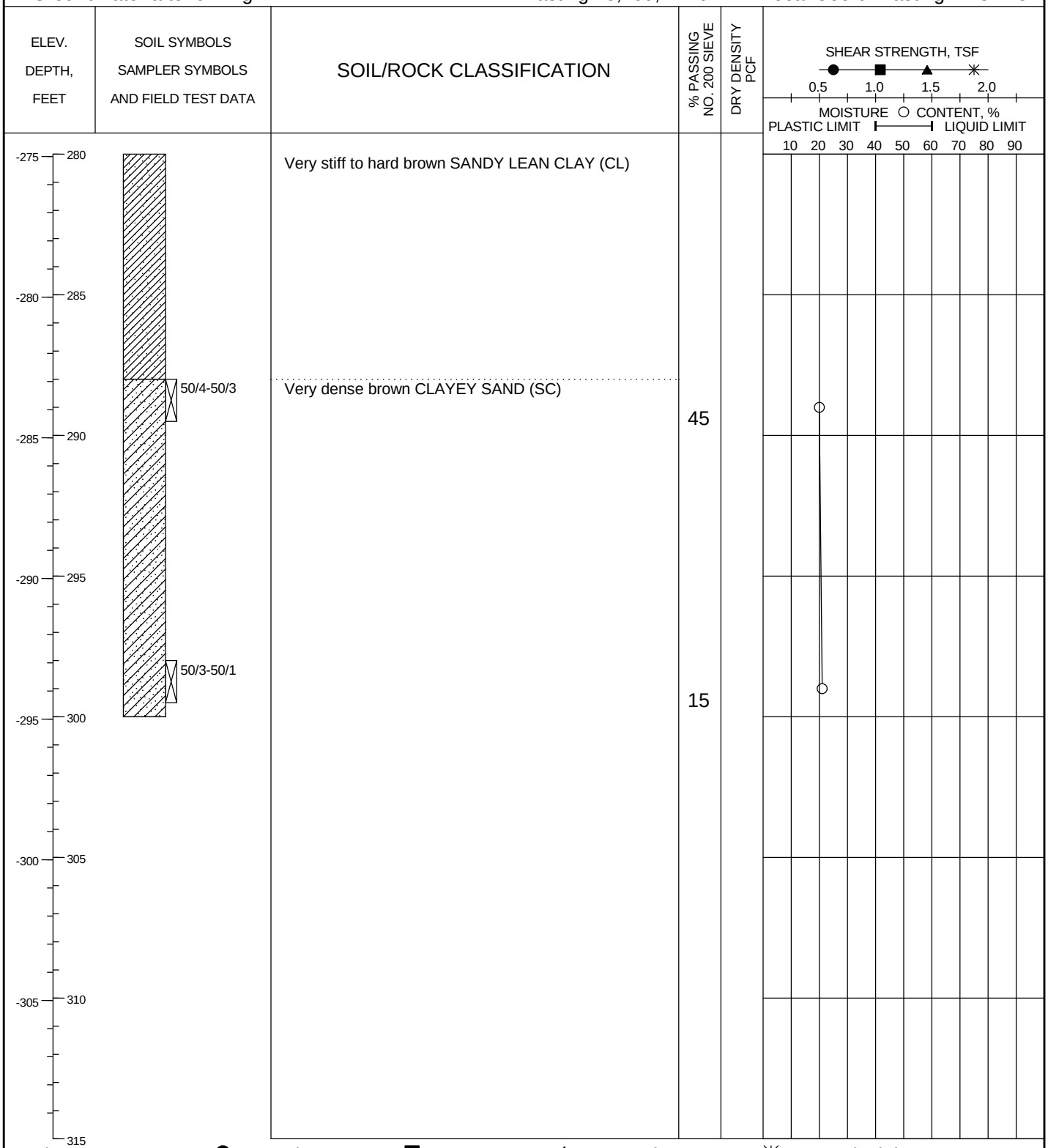
PLATE A-3h

HVJ ASSOCIATES

LOG OF SOIL BORING HG-10-15021.GPJ HVJ.GDT 12/29/10

LOG OF BORING

Project: Battleship Texas
Project No.: HG1015021
Boring No.: B-3
Date: 11/22/2010
Elevation: 5.08 feet
Groundwater during drilling: 5 feet
Northing: 13,845,133.3
Local Coord. Northing: 13.7
Groundwater after drilling: ---
Easting: 3,209,111.9
Local Coord. Easting: -787.18



Shear Types: ● = Hand Penet. ■ = Torvane ▲ = Unconf. Comp. ✳ = UU Triaxial

See Plate 2 for boring location.

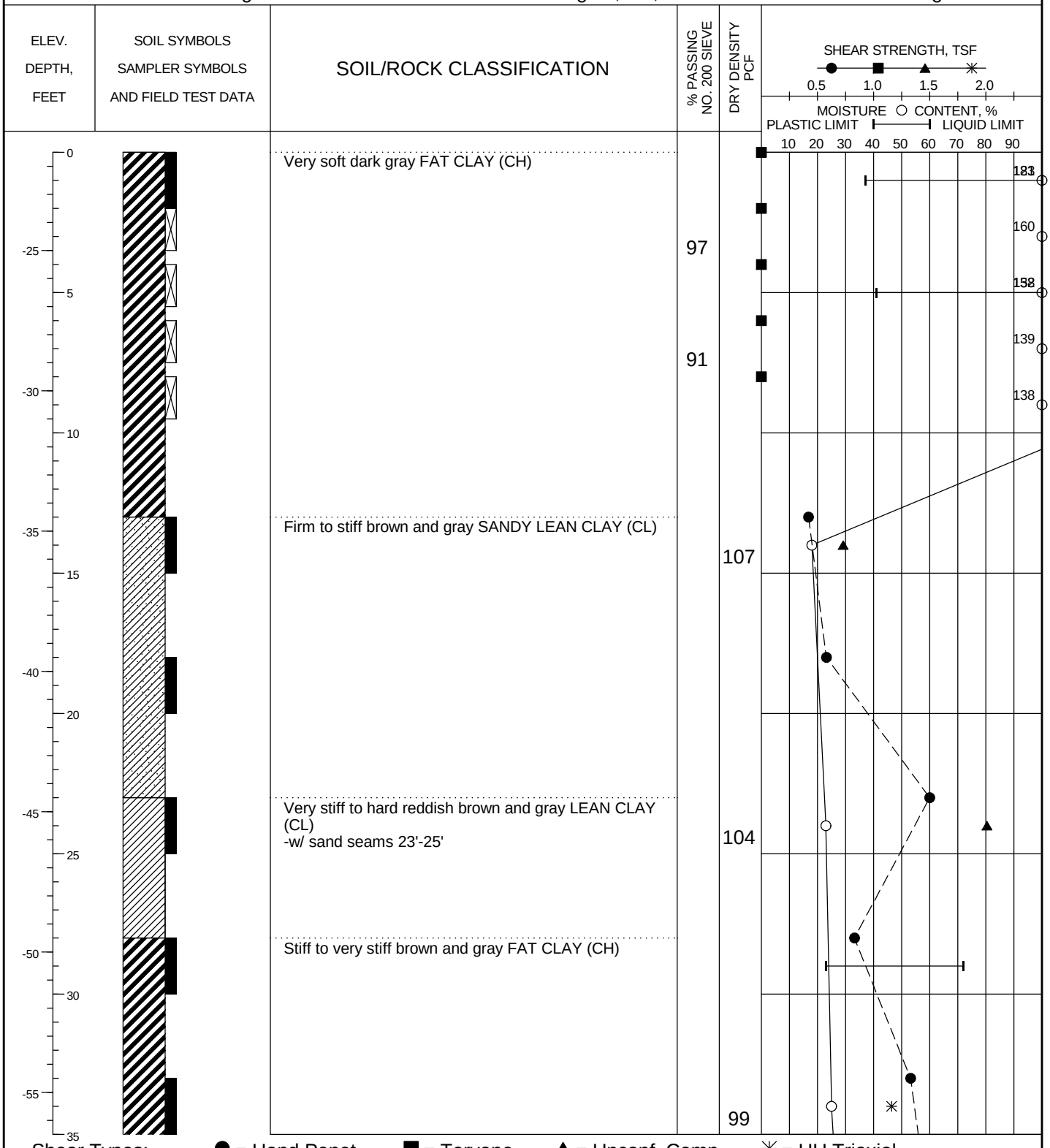
PLATE A-3i

HVJ ASSOCIATES

LOG OF SOIL BORING HG-10-15021.GPJ HVJ.GDT 12/29/10

LOG OF BORING

Project: Battleship Texas
Project No.: HG1015021
Boring No.: B-4 (Depth of Water = 20 feet)
Date: 11/30/2010
Elevation MLT: -21.50 feet
Groundwater during drilling: ---
Northing: 13,844,890.9
Local Coord. Northing: -242.29
Groundwater after drilling: ---
Easting: 3,209,006.2
Local Coord. Easting: -720.99



Shear Types: ● = Hand Penet. ■ = Torvane ▲ = Unconf. Comp. ✳ = UU Triaxial

See Plate 2 for boring location.

PLATE A-4a

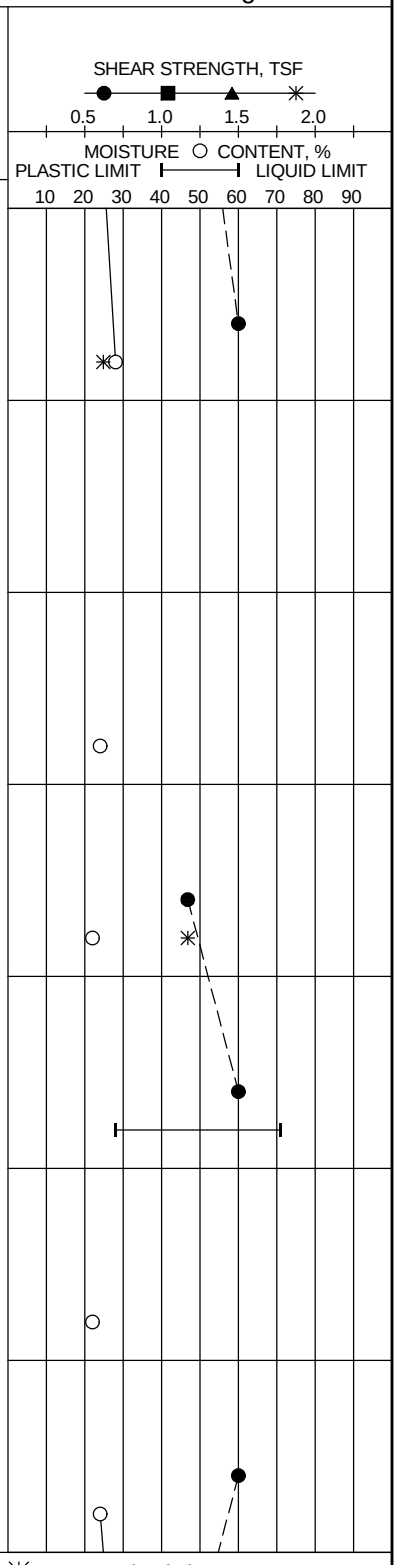
LOG OF SOIL BORING HG-10-15021.GPJ HVJ.GDT 12/29/10

HVJ ASSOCIATES

LOG OF BORING

Project: Battleship Texas
Project No.: HG1015021
Boring No.: B-4 (Depth of Water = 20 feet)
Date: 11/30/2010
Elevation MLT: -21.50 feet
Groundwater during drilling: ---
Northing: 13,844,890.9
Local Coord. Northing: -242.29
Groundwater after drilling: ---
Easting: 3,209,006.2
Local Coord. Easting: -720.99

ELEV. DEPTH, FEET	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	SOIL/ROCK CLASSIFICATION	% PASSING NO. 200 SIEVE	DRY DENSITY PCF
-60 / 40		Stiff to very stiff brown and gray FAT CLAY (CH)		
		slickensided 38'-40'		97
-65 / 45	50/4-50/2	Very dense brown CLAYEY SAND (SC)		
-70 / 50	50/2-50/1		39	
-75 / 55		Very stiff brown LEAN CLAY (CL) -w/ sand pockets 53'-55'		104
-80 / 60		Very stiff reddish brown FAT CLAY (CH)		
-85 / 65		Brown SILT (ML)	99	
-90 / 70		Stiff to very stiff brown and gray FAT CLAY (CH) -w/ sand seams 68'-70'		



Shear Types: ● = Hand Penet. ■ = Torvane ▲ = Unconf. Comp. ✳ = UU Triaxial

See Plate 2 for boring location.

PLATE A-4b

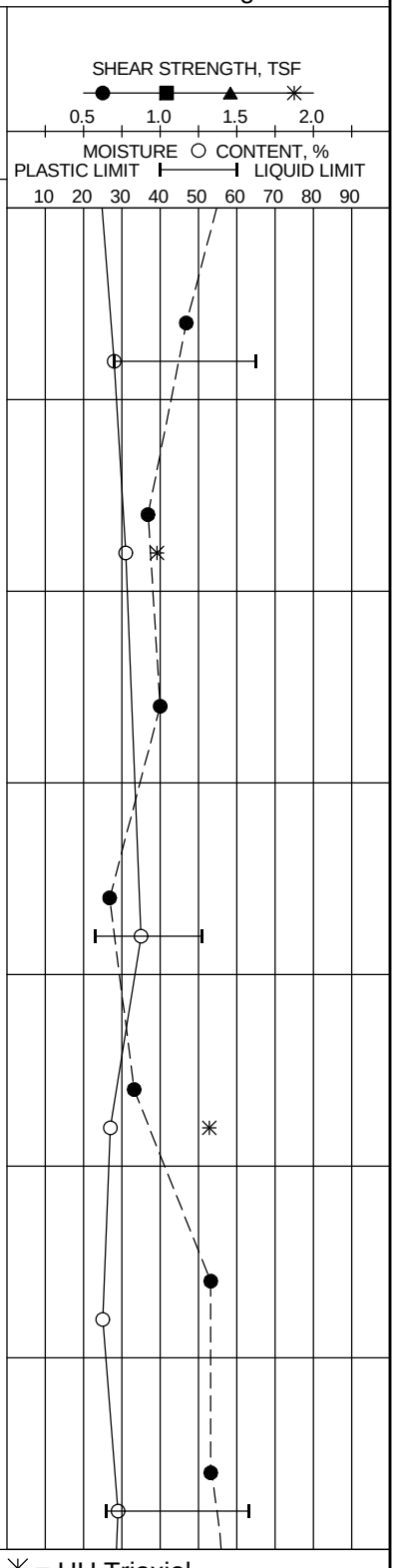
LOG OF SOIL BORING HG-10-15021.GPJ HVJ.GDT 12/29/10

HVJ ASSOCIATES

LOG OF BORING

Project: Battleship Texas
Project No.: HG1015021
Boring No.: B-4 (Depth of Water = 20 feet)
Date: 11/30/2010
Elevation MLT: -21.50 feet
Groundwater during drilling: ---
Northing: 13,844,890.9
Local Coord. Northing: -242.29
Groundwater after drilling: ---
Easting: 3,209,006.2
Local Coord. Easting: -720.99

ELEV. DEPTH, FEET	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	SOIL/ROCK CLASSIFICATION	% PASSING NO. 200 SIEVE	DRY DENSITY PCF
-70		Stiff to very stiff brown and gray FAT CLAY (CH) -w/ sand seams 68'-70'		
-95 / 75				84
-100 / 80				
-105 / 85			99	
-110 / 90				
-115 / 95		Stiff to very stiff gray LEAN CLAY (CL)		99
-120 / 100			95	
-125 / 105		Very stiff to hard gray and reddish brown FAT CLAY (CH)		



Shear Types: ● = Hand Penet. ■ = Torvane ▲ = Unconf. Comp. ✳ = UU Triaxial

See Plate 2 for boring location.

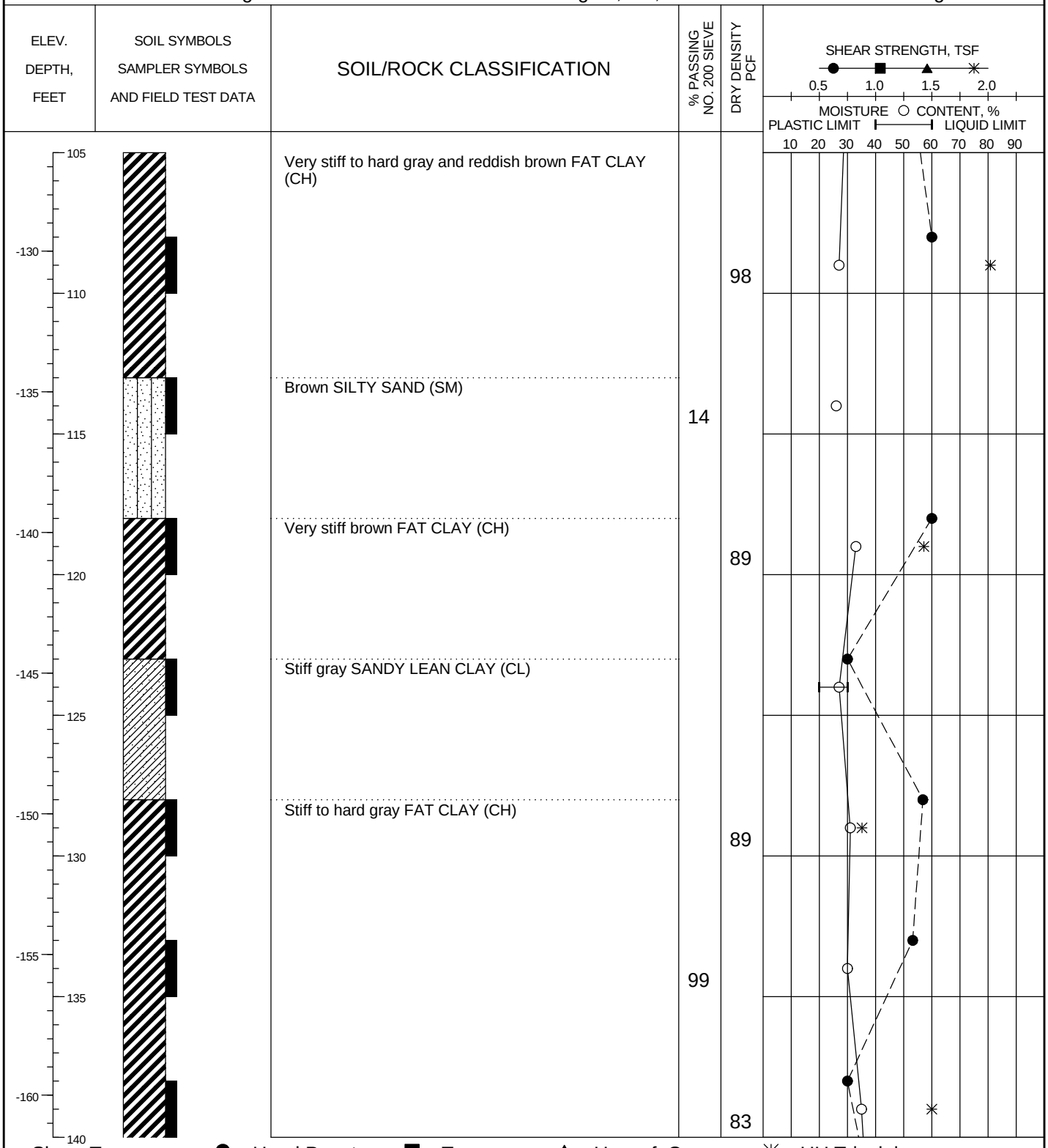
PLATE A-4c

LOG OF SOIL BORING HG-10-15021.GPJ HVJ.GDT 12/29/10

HVJ ASSOCIATES

LOG OF BORING

Project: Battleship Texas
Project No.: HG1015021
Boring No.: B-4 (Depth of Water = 20 feet)
Date: 11/30/2010
Elevation MLT: -21.50 feet
Groundwater during drilling: ---
Northing: 13,844,890.9
Local Coord. Northing: -242.29
Groundwater after drilling: ---
Easting: 3,209,006.2
Local Coord. Easting: -720.99



Shear Types: ● = Hand Penet. ■ = Torvane ▲ = Unconf. Comp. ✳ = UU Triaxial

See Plate 2 for boring location.

PLATE A-4d

LOG OF SOIL BORING HG-10-15021.GPJ HVJ.GDT 12/29/10

HVJ ASSOCIATES

LOG OF BORING

Project: Battleship Texas
Project No.: HG1015021
Boring No.: B-4 (Depth of Water = 20 feet)
Date: 11/30/2010
Elevation MLT: -21.50 feet
Groundwater during drilling: ---
Northing: 13,844,890.9
Local Coord. Northing: -242.29
Groundwater after drilling: ---
Easting: 3,209,006.2
Local Coord. Easting: -720.99

ELEV. DEPTH, FEET	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	SOIL/ROCK CLASSIFICATION	% PASSING NO. 200 SIEVE	DRY DENSITY PCF	SHEAR STRENGTH, TSF / MOISTURE CONTENT, %
140 / -165		Stiff to hard gray FAT CLAY (CH)		99	
145 / -170					
150 / -175					
155 / -180					
160 / -185					
165 / -190					
170 / -195					
175					

SHEAR STRENGTH, TSF: 0.5 1.0 1.5 2.0
MOISTURE ○ CONTENT, %
PLASTIC LIMIT — LIQUID LIMIT
10 20 30 40 50 60 70 80 90

Shear Types: ● = Hand Penet. ■ = Torvane ▲ = Unconf. Comp. ✳ = UU Triaxial

See Plate 2 for boring location.

PLATE A-4e

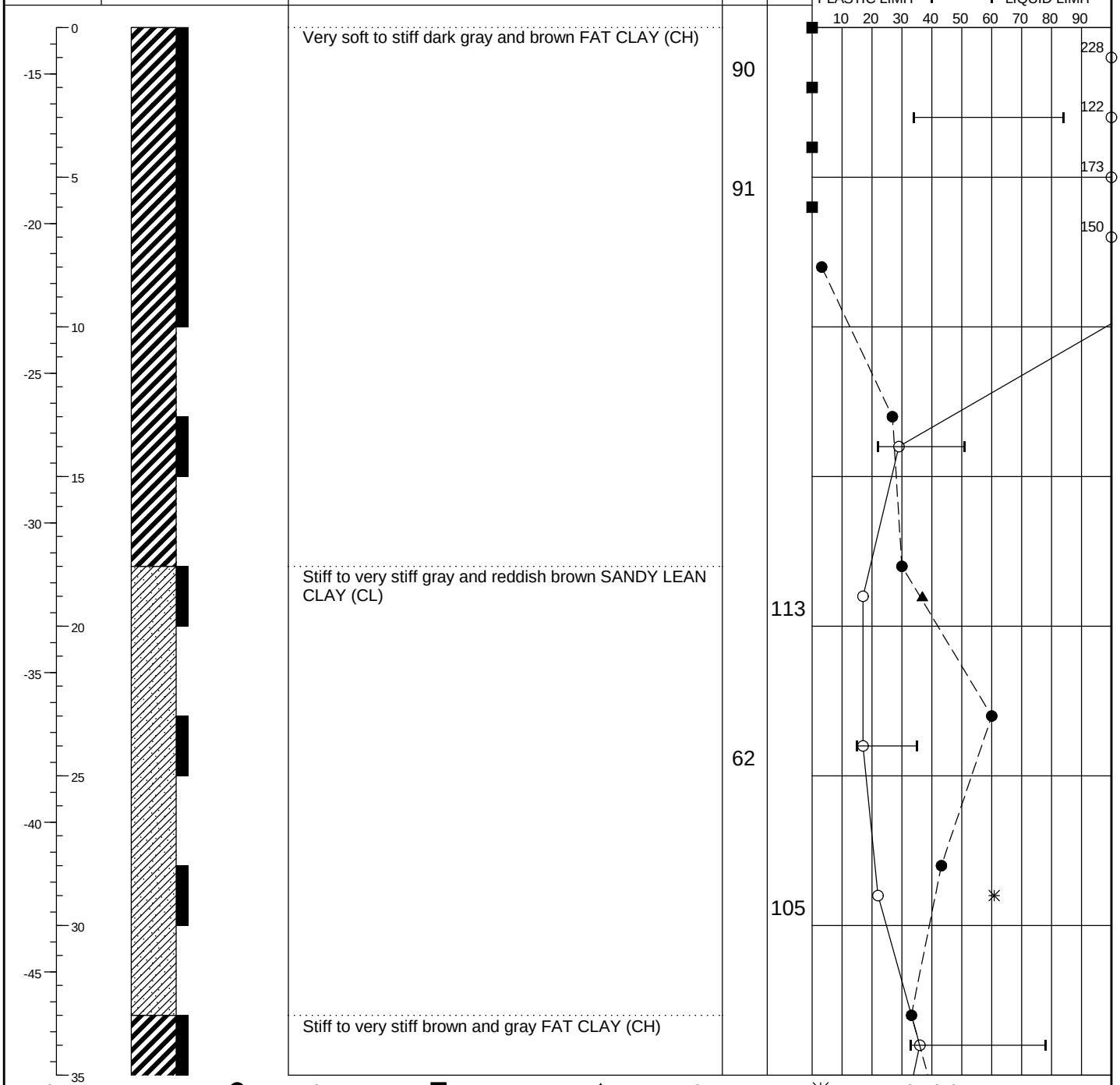
LOG OF SOIL BORING HG-10-15021.GPJ HVJ.GDT 12/29/10

HVJ ASSOCIATES

LOG OF BORING

Project: Battleship Texas
Project No.: HG1015021
Boring No.: B-5 (Depth of Water = 17 feet)
Date: 12/4/2010
Elevation MLT: -13.45 feet
Groundwater during drilling: ---
Northing: 13,844,706.5
Local Coord. Northing: -96.55
Groundwater after drilling: ---
Easting: 3,209,478.0
Local Coord. Easting: -235.84

ELEV. DEPTH, FEET	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	SOIL/ROCK CLASSIFICATION	% PASSING NO. 200 SIEVE	DRY DENSITY PCF
0 to -15		Very soft to stiff dark gray and brown FAT CLAY (CH)	90	
-15 to -20			91	
-20 to -30		Stiff to very stiff gray and reddish brown SANDY LEAN CLAY (CL)	62	113
-30 to -35		Stiff to very stiff brown and gray FAT CLAY (CH)		105



Shear Types: ● = Hand Penet. ■ = Torvane ▲ = Unconf. Comp. ✳ = UU Triaxial

See Plate 2 for boring location.

PLATE A-5a

LOG OF SOIL BORING HG-10-15021.GPJ HVJ.GDT 12/29/10

HVJ ASSOCIATES

LOG OF BORING

Project: Battleship Texas
Project No.: HG1015021
Boring No.: B-5 (Depth of Water = 17 feet)
Date: 12/4/2010
Elevation MLT: -13.45 feet
Groundwater during drilling: ---
Northing: 13,844,706.5
Local Coord. Northing: -96.55
Groundwater after drilling: ---
Easting: 3,209,478.0
Local Coord. Easting: -235.84

ELEV. DEPTH, FEET	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	SOIL/ROCK CLASSIFICATION	% PASSING NO. 200 SIEVE	DRY DENSITY PCF
-50 / 35		Stiff to very stiff brown and gray FAT CLAY (CH)		96
-55 / 40				
-60 / 45		Stiff to very stiff brown and gray SANDY LEAN CLAY (CL)		102
-65 / 50				
-70 / 55		Very stiff reddish brown LEAN CLAY (CL) -w/ calcareous nodules 58'-60'	91	95
-75 / 60				
-80 / 65		-w/ sand seams 68'-70'		
70				

SHEAR STRENGTH, TSF
0.5 1.0 1.5 2.0
MOISTURE ○ CONTENT, %
PLASTIC LIMIT — LIQUID LIMIT
10 20 30 40 50 60 70 80 90

Shear Types: ● = Hand Penet. ■ = Torvane ▲ = Unconf. Comp. ✳ = UU Triaxial

See Plate 2 for boring location.

PLATE A-5b

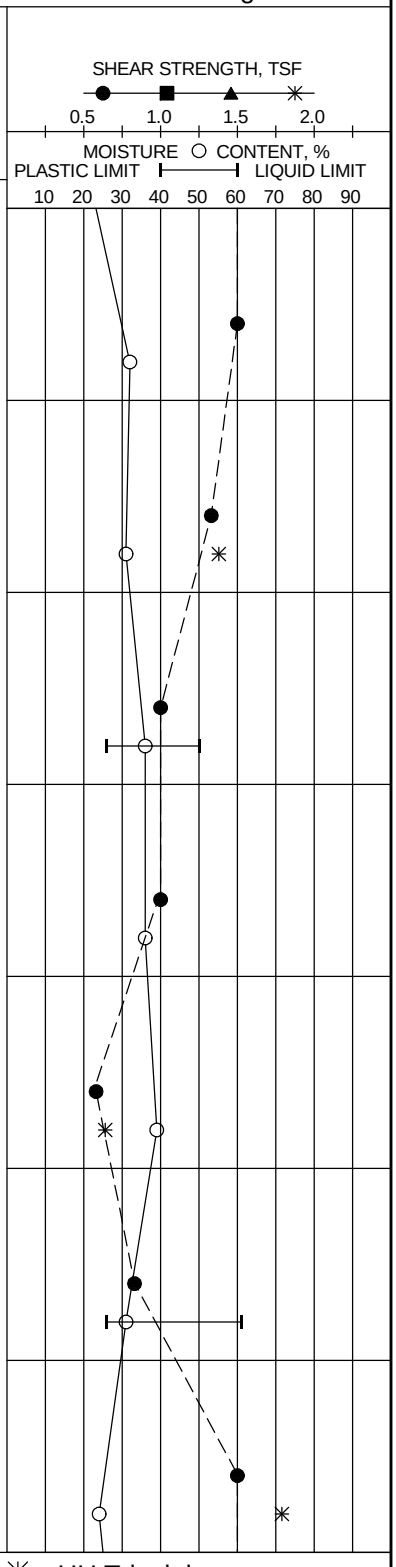
LOG OF SOIL BORING HG-10-15021.GPJ HVJ.GDT 12/29/10

HVJ ASSOCIATES

LOG OF BORING

Project: Battleship Texas
Project No.: HG1015021
Boring No.: B-5 (Depth of Water = 17 feet)
Date: 12/4/2010
Elevation MLT: -13.45 feet
Groundwater during drilling: ---
Northing: 13,844,706.5
Local Coord. Northing: -96.55
Groundwater after drilling: ---
Easting: 3,209,478.0
Local Coord. Easting: -235.84

ELEV. DEPTH, FEET	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	SOIL/ROCK CLASSIFICATION	% PASSING NO. 200 SIEVE	DRY DENSITY PCF
-70		Very stiff reddish brown LEAN CLAY (CL) -w/ calcareous nodules 58'-60'		
-85		Stiff to hard brown and gray FAT CLAY (CH)	99	84
-90				
-95				
-100				78
-105		-w/ calcareous nodules 103'-105'		95
-110				
-115				



Shear Types: ● = Hand Penet. ■ = Torvane ▲ = Unconf. Comp. ✳ = UU Triaxial

See Plate 2 for boring location.

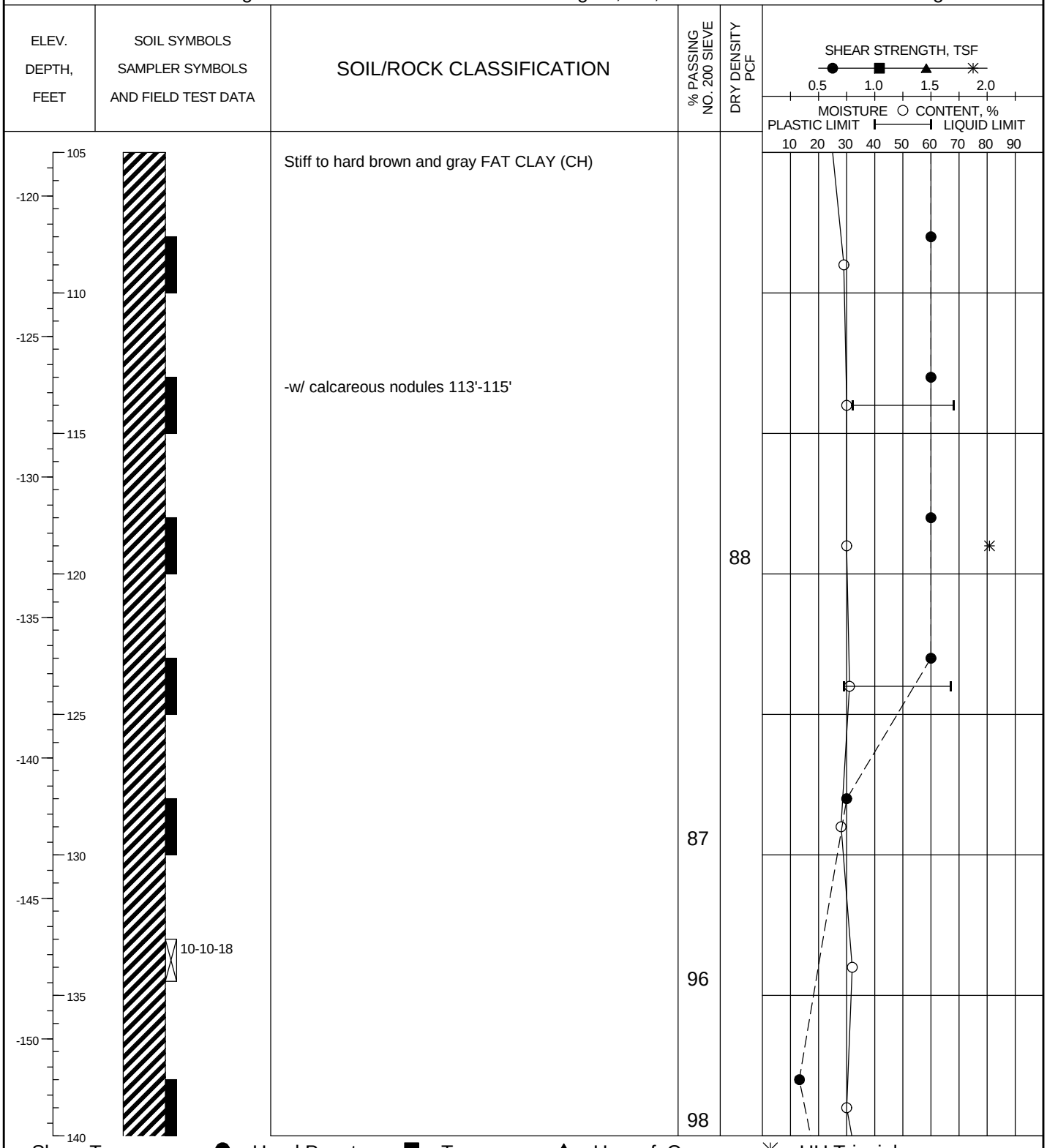
PLATE A-5c

LOG OF SOIL BORING HG-10-15021.GPJ HVJ.GDT 12/29/10

HVJ ASSOCIATES

LOG OF BORING

Project: Battleship Texas
Project No.: HG1015021
Boring No.: B-5 (Depth of Water = 17 feet)
Date: 12/4/2010
Elevation MLT: -13.45 feet
Groundwater during drilling: ---
Northing: 13,844,706.5
Local Coord. Northing: -96.55
Groundwater after drilling: ---
Easting: 3,209,478.0
Local Coord. Easting: -235.84



Shear Types: ● = Hand Penet. ■ = Torvane ▲ = Unconf. Comp. ✳ = UU Triaxial

See Plate 2 for boring location.

PLATE A-5d

LOG OF SOIL BORING HG-10-15021.GPJ HVJ.GDT 12/29/10

HVJ ASSOCIATES

LOG OF BORING

Project: Battleship Texas
Project No.: HG1015021
Boring No.: B-5 (Depth of Water = 17 feet)
Date: 12/4/2010
Elevation MLT: -13.45 feet
Groundwater during drilling: ---
Northing: 13,844,706.5
Local Coord. Northing: -96.55
Groundwater after drilling: ---
Easting: 3,209,478.0
Local Coord. Easting: -235.84

ELEV. DEPTH, FEET	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	SOIL/ROCK CLASSIFICATION	% PASSING NO. 200 SIEVE	DRY DENSITY PCF
140 / -155 / 145 / -160 / 150 / -165 / 155 / -170 / 160 / -175 / 165 / -180 / 170 / -185 / 175		Stiff to hard brown and gray FAT CLAY (CH)		78

SHEAR STRENGTH, TSF
0.5 1.0 1.5 2.0
MOISTURE ○ CONTENT, %
PLASTIC LIMIT — LIQUID LIMIT
10 20 30 40 50 60 70 80 90

Shear Types: ● = Hand Penet. ■ = Torvane ▲ = Unconf. Comp. ✳ = UU Triaxial

See Plate 2 for boring location.

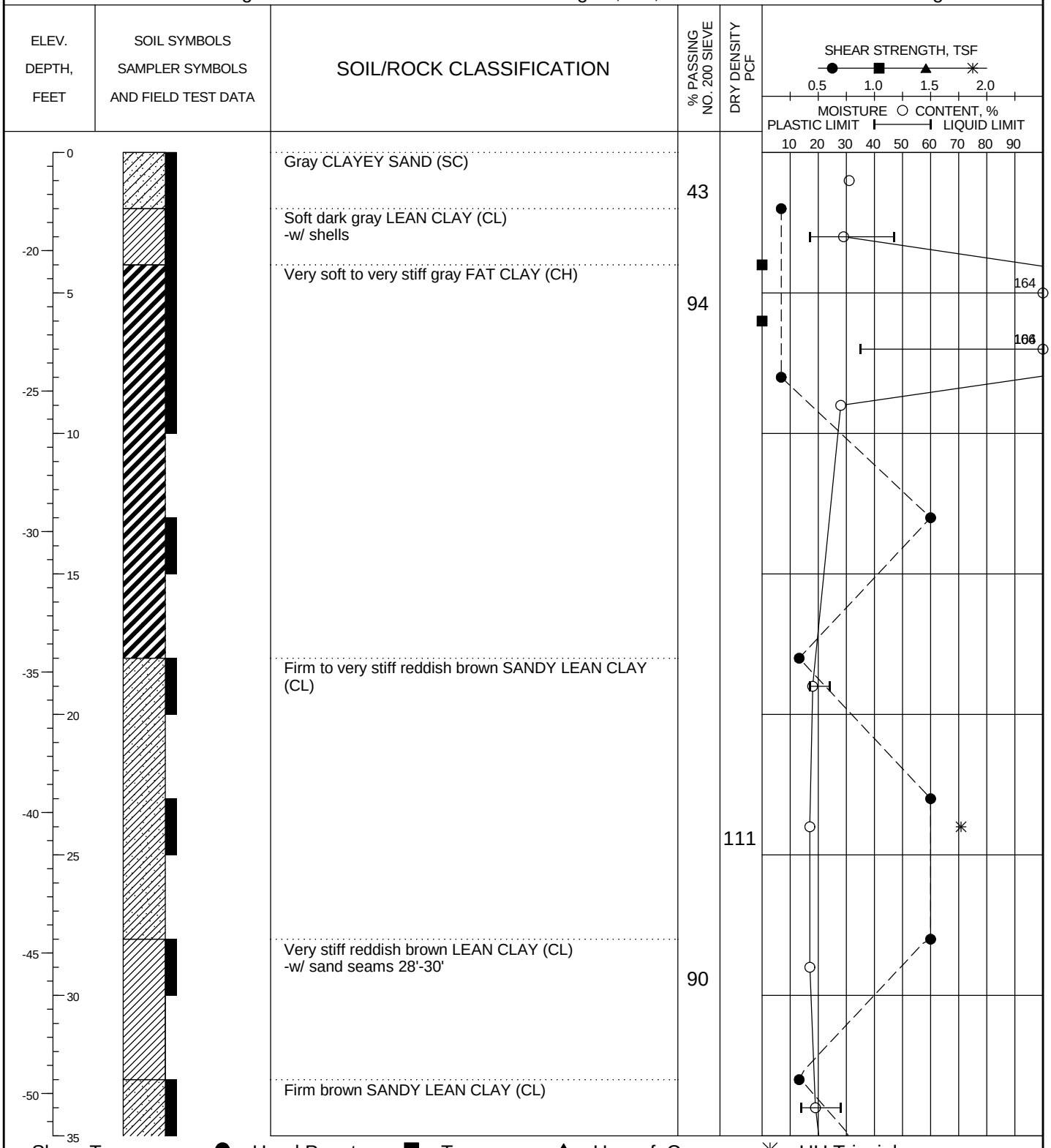
PLATE A-5e

HVJ ASSOCIATES

LOG OF SOIL BORING HG-10-15021.GPJ HVJ.GDT 12/29/10

LOG OF BORING

Project: Battleship Texas
Project No.: HG1015021
Boring No.: B-6 (Depth of Water = 16.5 feet)
Date: 11/17/2010
Elevation MLT: -16.51 feet
Groundwater during drilling: ---
Northing: 13,844,509.5
Local Coord. Northing: -195.46
Groundwater after drilling: ---
Easting: 3,209,569.3
Local Coord. Easting: -42.49



Shear Types: ● = Hand Penet. ■ = Torvane ▲ = Unconf. Comp. ✳ = UU Triaxial

See Plate 2 for boring location.

PLATE A-6a

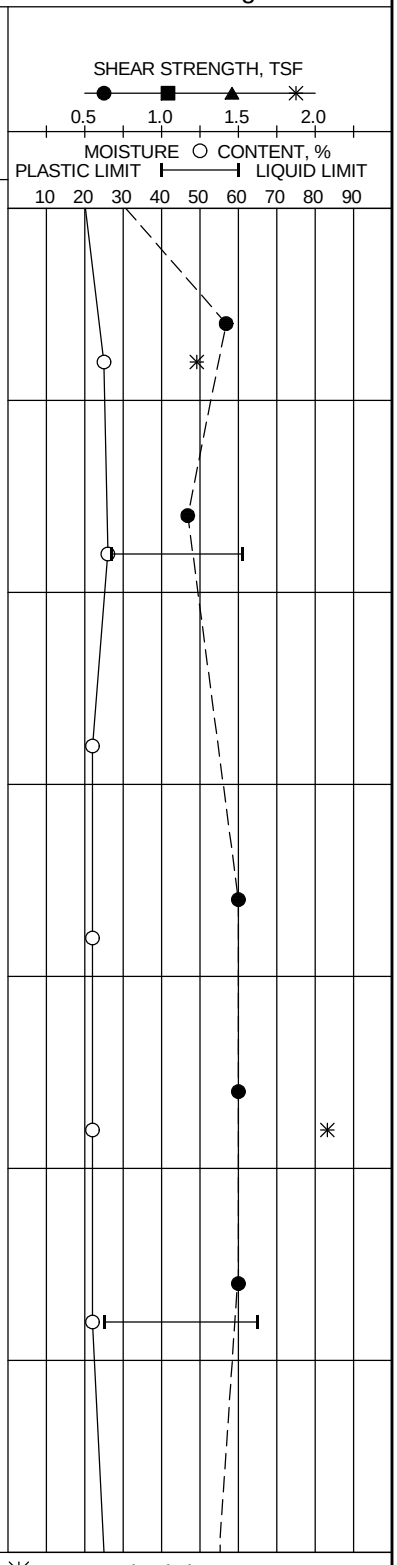
LOG OF SOIL BORING HG-10-15021.GPJ HVJ.GDT 12/29/10

HVJ ASSOCIATES

LOG OF BORING

Project: Battleship Texas
Project No.: HG1015021
Boring No.: B-6 (Depth of Water = 16.5 feet)
Date: 11/17/2010
Elevation MLT: -16.51 feet
Groundwater during drilling: ---
Northing: 13,844,509.5
Local Coord. Northing: -195.46
Groundwater after drilling: ---
Easting: 3,209,569.3
Local Coord. Easting: -42.49

ELEV. DEPTH, FEET	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	SOIL/ROCK CLASSIFICATION	% PASSING NO. 200 SIEVE	DRY DENSITY PCF
-35 / 35		Firm brown SANDY LEAN CLAY (CL)		
-55 / 40		Stiff to hard reddish brown and gray FAT CLAY (CH)		94
-60 / 45				
-65 / 50	13-17-19		97	
-70 / 55				
-75 / 60				106
-80 / 65				
-85 / 70				



Shear Types: ● = Hand Penet. ■ = Torvane ▲ = Unconf. Comp. ✳ = UU Triaxial

See Plate 2 for boring location.

PLATE A-6b

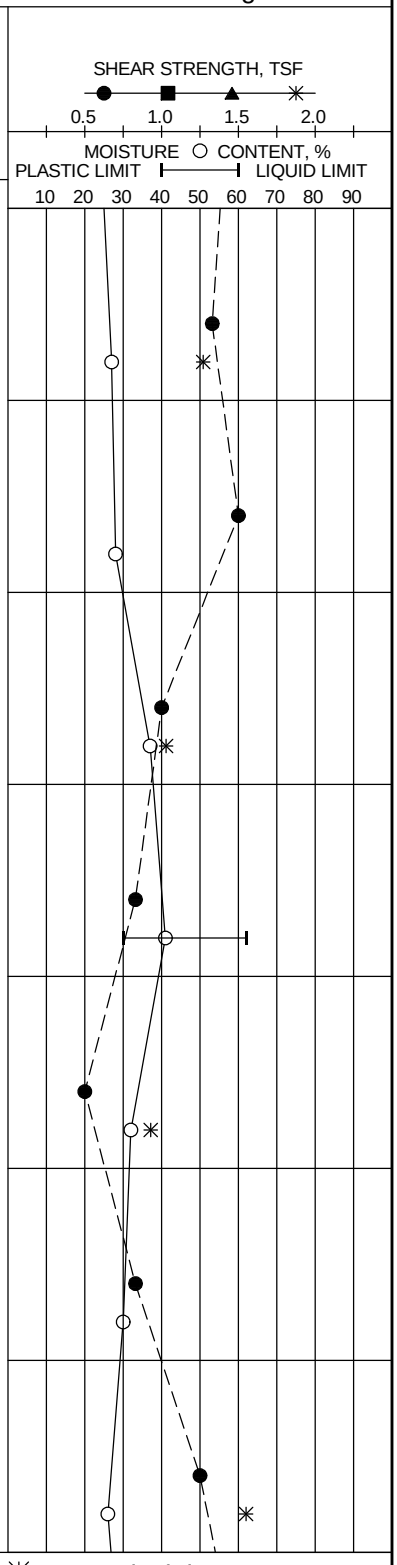
LOG OF SOIL BORING HG-10-15021.GPJ HVJ.GDT 12/29/10

HVJ ASSOCIATES

LOG OF BORING

Project: Battleship Texas
Project No.: HG1015021
Boring No.: B-6 (Depth of Water = 16.5 feet)
Date: 11/17/2010
Elevation MLT: -16.51 feet
Groundwater during drilling: ---
Northing: 13,844,509.5
Local Coord. Northing: -195.46
Groundwater after drilling: ---
Easting: 3,209,569.3
Local Coord. Easting: -42.49

ELEV. DEPTH, FEET	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	SOIL/ROCK CLASSIFICATION	% PASSING NO. 200 SIEVE	DRY DENSITY PCF
-90 / 70		Stiff to hard reddish brown and gray FAT CLAY (CH)		94
-95 / 75				
-100 / 80				84
-105 / 85				
-110 / 90				86
-115 / 95				
-120 / 100		-w/ calcareous nodules 103'-105'		100
105				



Shear Types: ● = Hand Penet. ■ = Torvane ▲ = Unconf. Comp. ✳ = UU Triaxial

See Plate 2 for boring location.

PLATE A-6c

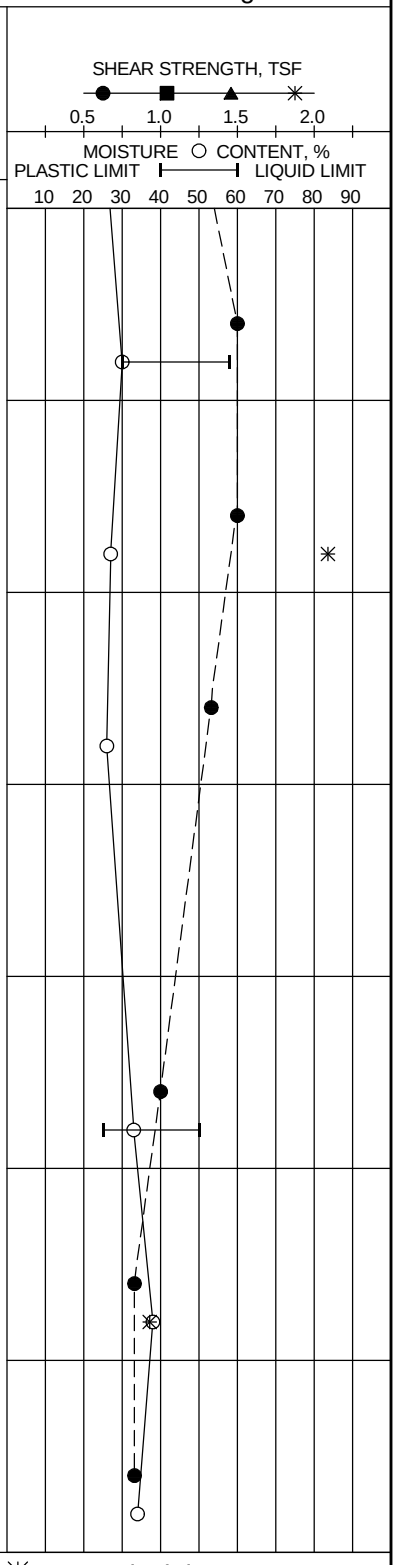
LOG OF SOIL BORING HG-10-15021.GPJ HVJ.GDT 12/29/10

HVJ ASSOCIATES

LOG OF BORING

Project: Battleship Texas
Project No.: HG1015021
Boring No.: B-6 (Depth of Water = 16.5 feet)
Date: 11/17/2010
Elevation MLT: -16.51 feet
Groundwater during drilling: ---
Northing: 13,844,509.5
Local Coord. Northing: -195.46
Groundwater after drilling: ---
Easting: 3,209,569.3
Local Coord. Easting: -42.49

ELEV. DEPTH, FEET	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	SOIL/ROCK CLASSIFICATION	% PASSING NO. 200 SIEVE	DRY DENSITY PCF
-125 / 105		Stiff to hard reddish brown and gray FAT CLAY (CH)		
-130 / 110		-w/ calcareous nodules 113'-115'		90
-135 / 115		-w/ sand seams 118'-120'	90	
-140 / 120				
-145 / 125				
-150 / 130				82
-155 / 135			97	
140				



Shear Types: ● = Hand Penet. ■ = Torvane ▲ = Unconf. Comp. ✳ = UU Triaxial

See Plate 2 for boring location.

PLATE A-6d

LOG OF SOIL BORING HG-10-15021.GPJ HVJ.GDT 12/29/10

HVJ ASSOCIATES

SOIL SYMBOLS

Soil Types


Clay


Silt


Sand


Gravel

Modifiers


Clayey


Silty


Sandy


Cemented

Construction Materials


Asphaltic Concrete


Stabilized Base


Fill or Debris


Portland Cement Concrete

SAMPLER TYPES


Thin Walled Shelby Tube


No Recovery


Split Barrel


Core


Liner Tube


Jar Sample

WATER LEVEL SYMBOLS


Groundwater level after drilling in open borehole or piezometer


Groundwater level determined during drilling operations

SOIL GRAIN SIZE

Classification	Particle Size	Particle Size or Sieve No. (U.S. Standard)
Clay	< 0.002 mm	< 0.002 mm
Silt	0.002 - 0.075 mm	0.002 mm - #200 sieve
Sand	0.075 - 4.75 mm	#200 sieve - #4 sieve
Gravel	4.75 - 75 mm	#4 sieve - 3 in.
Cobble	75 - 200 mm	3 in. - 8 in.
Boulder	> 200 mm	> 8 in.

DENSITY OF COHESIONLESS SOILS

Descriptive Term	Penetration Resistance "N" * Blows/Foot
Very Loose	0 - 4
Loose	4 - 10
Medium Dense	10 - 30
Dense	30 - 50
Very Dense	> 50

CONSISTENCY OF COHESIVE SOILS

Consistency	Undrained Shear Strength (tsf)	Penetration Resistance "N" * Blows/Foot
Very Soft	0 - 0.125	0 - 2
Soft	0.125 - 0.25	2 - 4
Firm	0.25 - 0.5	4 - 8
Stiff	0.5 - 1.0	8 - 16
Very Stiff	1.0 - 2.0	16 - 32
Hard	> 2.0	> 32

PENETRATION RESISTANCE

3/6	Blows required to penetrate each of three consecutive 6-inch increments per ASTM D-1586 *
50/4"	If more than 50 blows are required, driving is discontinued and penetration at 50 blows is noted
0/18"	Sampler penetrated full depth under weight of drill rods and hammer

* The N value is taken as the blows required to penetrate the final 12 inches

TERMS DESCRIBING SOIL STRUCTURE

Slickensided	Fracture planes appear polished or glossy, sometimes striated
Fissured	Breaks along definite planes of fracture with little resistance to fracturing
Inclusion	Small pockets of different soils, such as small lenses of sand scattered through a mass of clay
Parting	Inclusion less than 1/4 inch thick extending through the sample
Seam	Inclusion 1/4 inch to 3 inches thick extending through the sample
Layer	Inclusion greater than 3 inches thick extending through the sample
Laminated	Soil sample composed of alternating partings of different soil type
Stratified	Soil sample composed of alternating seams or layers of different soil type
Intermixed	Soil sample composed of pockets of different soil type and laminated or stratified structure is not evident
Calcareous	Having appreciable quantities of calcium carbonate
Ferrous	Having appreciable quantities of iron
Nodule	A small mass of irregular shape

HVJ ASSOCIATES
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KEY TO TERMS AND SYMBOLS USED ON BORING LOGS

PROJECT NO.: HG1015021

DRAWING NO.: PLATE A-7

APPENDIX B

ENVIRONMENTAL BORING LOGS

HVJ Associates Inc.

Telephone:
Fax:

Client: AECOM		Job No.: HG1015021	Boring/Well: PZ1
Project: BATTLESHIP TEXAS		Well Construction Data	
Date Started: 11/29/10	Date Completed: 11/29/10	Screen:	From: 8.2 - To: 43.2
Logged By: EFH	Checked By: EFH	Pack:	From: 7.2 - To: 43.2
Drilling Co.: VAN & SONS	Driller:	Seal:	From: 2.4 - To: 7.2
Method: mud rotary	Equipment:	Grout:	From: 0 - To: 2.4
Boring Depth: 43.2	Ground Surface Elevation: 6.0	Inner Casing:	
Initial GW Level: ▽	GW Level: ▼ 0.8 Time/Date: 12/2/10	Outer Casing/Stick Up:	

Depth	Sample	Sample Number	Blow Count Rec./RQD	PID (ppm)	Lithology	Description	Remarks	Well Construction
0						Topsoil and fill		
						Sandy lean clay		
10						Gray fine sand and silt some clay		
15						Dark gray fat clay		
30						Gray lean clay		
40								

LAEWNL03 BATTLESHIP TEXAS.GPJ LAEWNL03.GDT 1/4/11

HVJ Associates Inc.

Telephone:
Fax:

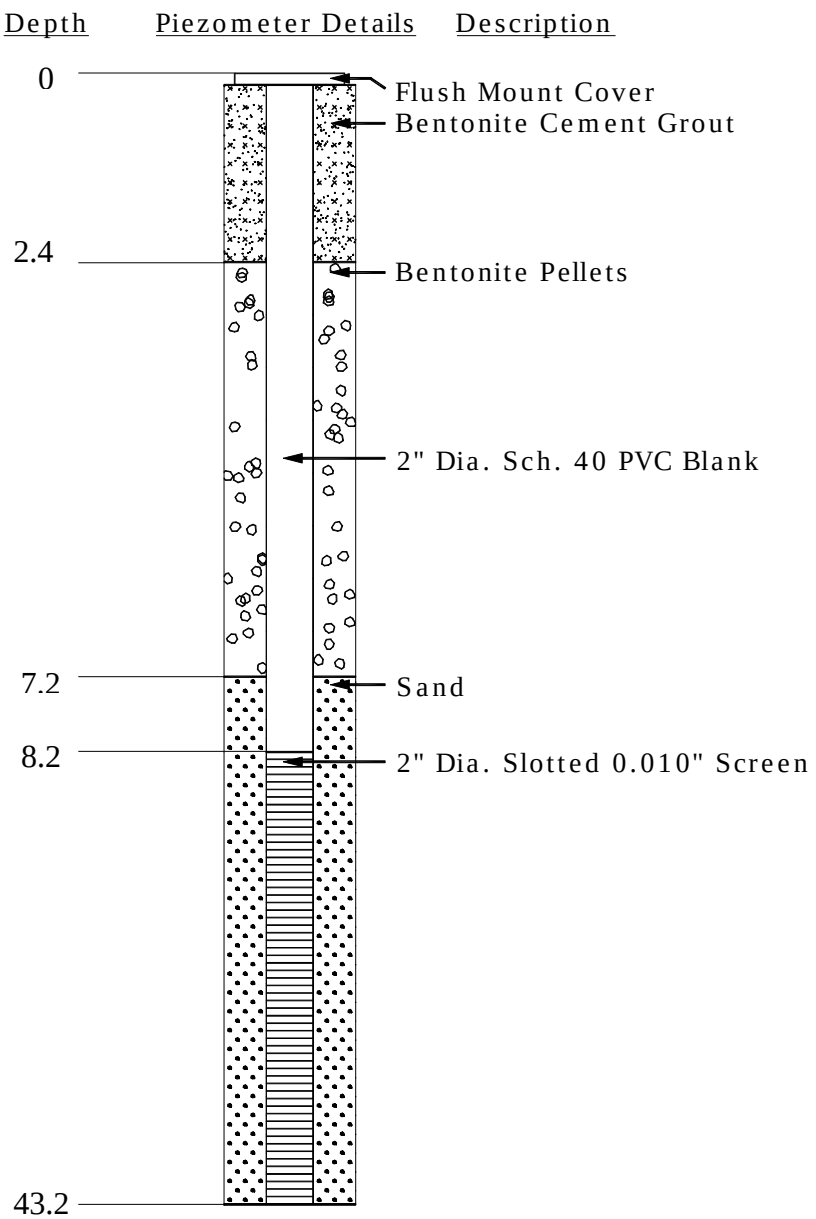
Client: AECOM		Job No.: HG1015021	Boring/Well: PZ2
Project: BATTLESHIP TEXAS		Well Construction Data	
Date Started: 11/29/10	Date Completed: 11/29/10	Screen:	From: 7.7 - To: 42.7
Logged By: EFH	Checked By: EFH	Pack:	From: 6.7 - To: 42.7
Drilling Co.: VAN & SONS	Driller:	Seal:	From: 2.7 - To: 6.7
Method: mud rotary	Equipment:	Grout:	From: 0 - To: 2.7
Boring Depth: 42.7	Ground Surface Elevation: 10.6	Inner Casing:	
Initial GW Level:	GW Level: 1.5 Time/Date: 12/2/10	Outer Casing/Stick Up:	

Depth	Sample	Sample Number	Blow Count Rec./RQD	PID (ppm)	Lithology	Description	Remarks	Well Construction
0						Topsoil and fill		
						Gray fat clay minor sand		
20						Sandy lean clay		

LAEWNL03 BATTLESHIP TEXAS.GPJ LAEWNL03.GDT 1/4/11

APPENDIX C

PIEZOMETER INSTALLATION REPORT



Water Level Readings

Date	Depth (ft.)	Elev. (ft.)
11/29/10	5.29	0.74
12/2/10	5.26	0.77

NOTES:

- Piezometer was installed on 11/29/10. DTW measured from ground surface.

HVJ ASSOCIATES
6120 S. Dairy Ashford Road
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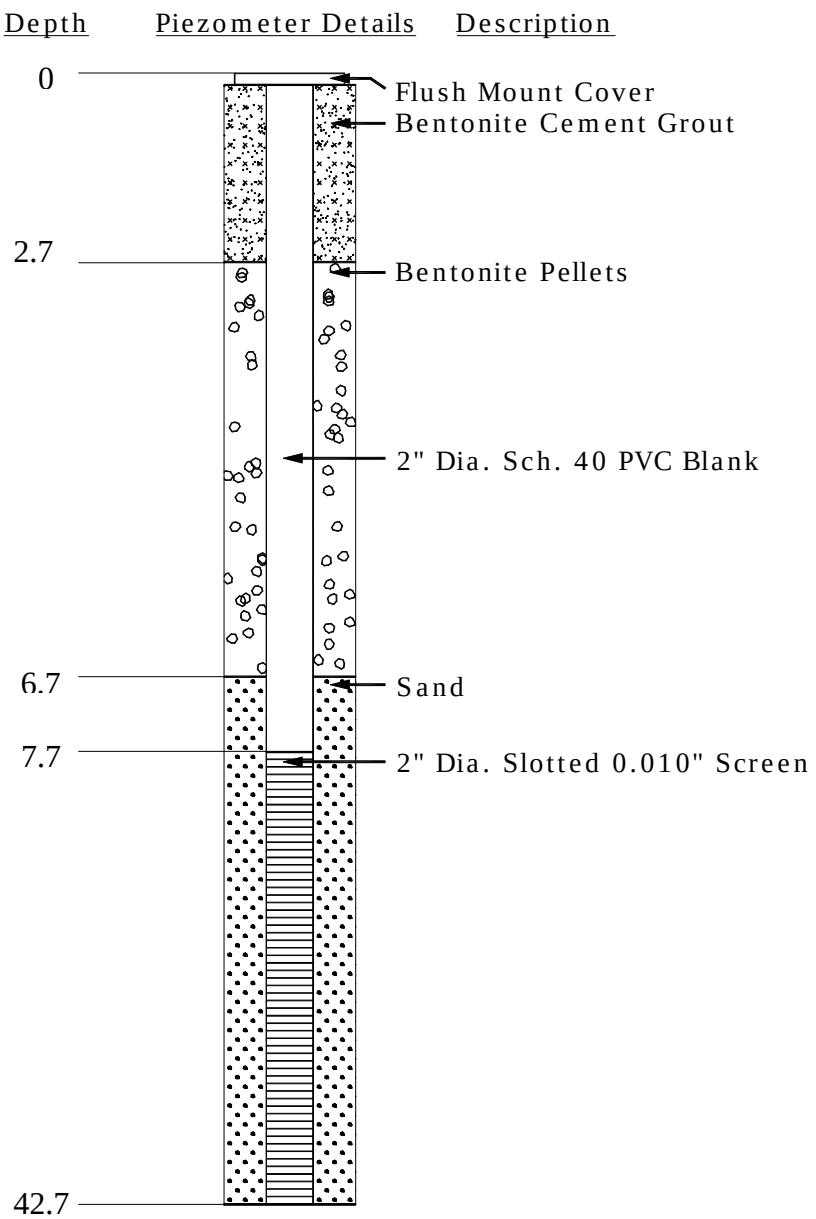
281.933.7293 Fax

PIEZOMETER INSTALLATION REPORT
PIEZOMETER NO. PZ1

PROJECT NO.:	DRAWING NO.:
HG1015021	PLATE C-1



Water Level Readings

Date	Depth (ft.)	Elev. (ft.)
12/2/10	9.17	1.47

NOTES:

- Piezometer was installed on 11/29/10.
- DTW measured from the ground surface.

HVJ ASSOCIATES
6120 S. Dairy Ashford Road
Houston, Texas 77072-1010
281.933.7388 Ph
281.933.7293 Fax

PIEZOMETER INSTALLATION REPORT
PIEZOMETER NO. PZ2

PROJECT NO.:	DRAWING NO.:
HG1015021	PLATE C-2

APPENDIX D

SUMMARY OF LABORATORY TEST RESULTS

Project: Battleship Texas
Location: Houston, Texas
Project Number: HG1015021

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	% Pass #200 Sieve	Moisture Content (%)	Unit Weight (pcf)	Shear Strength (UC) (tsf)	Shear Strength (UU) (tsf)	Shear Strength (Pocket
B-1	0									1.5
B-1	1	60	26	34		18.5				
B-1	2									1.5
B-1	3					18				
B-1	4									0.92
B-1	5					25.9	119.7	0.83		
B-1	6									0.33
B-1	7	66	23	43	85	28.7				
B-1	8									0.58
B-1	9					24.8	117.6	1.01		
B-1	13									1.08
B-1	14	46	17	29		19.4				
B-1	19				52	15.8				
B-1	23									0.5
B-1	24				83	20.2				
B-1	29					26.4				
B-1	34				94	28.3				
B-1	38									1.25
B-1	39					16.4	122.7		1.78	
B-1	43									1.5
B-1	44	65	26	39		23.9				
B-1	48									0.58
B-1	49					17.7	134.9		0.97	
B-1	54				59	17.6				
B-1	58									1.5
B-1	59					10.7	123.5		1.5	
B-1	63									1.33
B-1	64	80	33	47		30.3				
B-1	68									1.5
B-1	69					24.8	117.2		1.58	

PLATE D-1

Project: Battleship Texas
Location: Houston, Texas
Project Number: HG1015021

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	% Pass #200 Sieve	Moisture Content (%)	Unit Weight (pcf)	Shear Strength (UC) (tsf)	Shear Strength (UU) (tsf)	Shear Strength (Pocket
B-1	73									1.5
B-1	74					20.5				
B-1	78									1.33
B-1	79					22.2	120.4		1.19	
B-1	83									1.5
B-1	84	60	26	34		23.2				
B-1	88									1.5
B-1	89					26.4	115.5		1.94	
B-1	93									1.5
B-1	94	36	20	16		23.6				
B-1	98									1.5
B-1	99					30.8	114		1.66	
B-1	103									1.5
B-1	104					26.1				
B-1	108									1.25
B-1	109					40.9	118.5		1.05	
B-1	113									0.75
B-1	114				97	23.7				
B-1	118									0.75
B-1	119					42.2				
B-2	1				19	12.4				
B-2	2									1
B-2	3	31	16	15		19.4				
B-2	4									0.58
B-2	5				50	18.8				
B-2	6									0.58
B-2	7					19.8				
B-2	9				28					
B-2	13									0.33
B-2	14					36.9				

PLATE D-2

Project: Battleship Texas
Location: Houston, Texas
Project Number: HG1015021

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	% Pass #200 Sieve	Moisture Content (%)	Unit Weight (pcf)	Shear Strength (UC) (tsf)	Shear Strength (UU) (tsf)	Shear Strength (Pocket
B-2	18									0.58
B-2	19	67	28	39		52.1	102.2	0.19		
B-2	23									0.17
B-2	24					6.5	126.5	0.28		
B-2	28									0.17
B-2	29	27	14	13		21.3				
B-2	33									1.5
B-2	34					16.5	126.3		1.83	
B-2	38									0.67
B-2	39				95	31.4				
B-2	43									1.5
B-2	44	37	15	22		14.8				
B-2	48									1.5
B-2	49					16.8	124.5		1.76	
B-2	53									1.5
B-2	54				94	25				
B-2	58									1.08
B-2	59					26.5	126.8		1.11	
B-2	63									1.5
B-2	64	60	25	35		21.6				
B-2	68									1.5
B-2	69					17.8	121.3		1.77	
B-2	74				15	24.3				
B-2	78									1.5
B-2	79					17.8	123.6		2.43	
B-2	83									1.5
B-2	84	81	33	48		28.9				
B-2	88									1.5
B-2	89					21.9	129.6		1.66	
B-2	93									1.5

PLATE D-3

Project: Battleship Texas
Location: Houston, Texas
Project Number: HG1015021

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	% Pass #200 Sieve	Moisture Content (%)	Unit Weight (pcf)	Shear Strength (UC) (tsf)	Shear Strength (UU) (tsf)	Shear Strength (Pocket
B-2	94					33.8				
B-2	98									0.92
B-2	99				97	31.1				
B-2	103									0.83
B-2	104					42.8	108.2		1.04	
B-2	108									0.67
B-2	109	50	25	25		37.4				
B-2	113									0.67
B-2	114					32.8	100.7		0.69	
B-2	118									0.67
B-2	119				97	30.7				
B-3	0									1.5
B-3	1	44	18	26		15.9				
B-3	2									1
B-3	3				67	17				
B-3	4									0.17
B-3	5	70	23	47		36.9				
B-3	6									0.83
B-3	7					26.2	121.6	0.74		
B-3	8									0.58
B-3	13									0.17
B-3	14				60	20.6				
B-3	18									0.42
B-3	19	24	15	9		21.2				
B-3	23									0.83
B-3	24				67	20.7				
B-3	28									1.5
B-3	29					29.6	117.2	0.93		
B-3	33									1.33
B-3	38									1.5

PLATE D-4

Project: Battleship Texas
Location: Houston, Texas
Project Number: HG1015021

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	% Pass #200 Sieve	Moisture Content (%)	Unit Weight (pcf)	Shear Strength (UC) (tsf)	Shear Strength (UU) (tsf)	Shear Strength (Pocket
B-3	39	55	23	32		27.4				
B-3	43									1.5
B-3	44				67	16.2				
B-3	48									1.5
B-3	49					17.1	128		1.77	
B-3	53									1.5
B-3	54	51	18	33		23.3				
B-3	58									1.08
B-3	59					35.5	111.4		1.07	
B-3	63									1.5
B-3	64				98	24.3				
B-3	68									1.5
B-3	69					25.5	117.6		1.96	
B-3	73									1
B-3	74	29	16	13		16.6				
B-3	78									1
B-3	79					21.6	121.6		1.53	
B-3	83									1
B-3	84	38	17	21		17.7				
B-3	88									1
B-3	89					18.9	122.4		0.9	
B-3	93									1.5
B-3	94					22.6				
B-3	98									1.5
B-3	99				99	28.6				
B-3	103									1.42
B-3	104					32.6	118.5		1.32	
B-3	108									1
B-3	109					29.6				
B-3	113									0.92

PLATE D-5

Project: Battleship Texas
Location: Houston, Texas
Project Number: HG1015021

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	% Pass #200 Sieve	Moisture Content (%)	Unit Weight (pcf)	Shear Strength (UC) (tsf)	Shear Strength (UU) (tsf)	Shear Strength (Pocket
B-3	114	70	27	43		41.7				
B-3	118									0.67
B-3	119					25	107.3		0.48	
B-3	123									0.83
B-3	124				95	31.4				
B-3	128									1.25
B-3	129					31.1	124.1		1.09	
B-3	133									1.33
B-3	134	64	26	38		29.6				
B-3	138									1.5
B-3	139					28.8	119.8		2.1	
B-3	143									1.08
B-3	144	66	27	39		30.4				
B-3	148									1.5
B-3	149					33.6	117		1.76	
B-3	153									0.92
B-3	154				91	32.7				
B-3	158									0.75
B-3	159	61	25	36		36.6				
B-3	163									0.58
B-3	164					30.9	111.7		1.32	
B-3	168									0.67
B-3	169				97	32				
B-3	173									1.33
B-3	174	39	16	23		22				
B-3	178									1.5
B-3	179					28.6	126		1.48	
B-3	184				69	26.6				
B-3	189	60	23	37		35.6				
B-3	193									0.67

PLATE D-6

Project: Battleship Texas
Location: Houston, Texas
Project Number: HG1015021

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	% Pass #200 Sieve	Moisture Content (%)	Unit Weight (pcf)	Shear Strength (UC) (tsf)	Shear Strength (UU) (tsf)	Shear Strength (Pocket
B-3	194					34.5	113.9		1.33	
B-3	198									0.75
B-3	199				87	23.8				
B-3	208									0.83
B-3	209					24.7	114.6		0.83	
B-3	219				20	22.6				
B-3	229				12	18.9				
B-3	238									1.5
B-3	239					28.4	125.1		2.18	
B-3	248									1.42
B-3	249	27	16	11		16.7				
B-3	258									1.5
B-3	259					26.4	127.7		3.29	
B-3	268									1.5
B-3	269	53	21	32		21.2				
B-3	278									1.5
B-3	279					16.9	129.2		3.39	
B-3	289				45	20.2				
B-3	299				15	21.1				
B-4 (Depth of Water = 20 feet)	1	121	37	84		182.7				
B-4 (Depth of Water = 20 feet)	3				97	160				
B-4 (Depth of Water = 20 feet)	5	132	41	91		157.8				
B-4 (Depth of Water = 20 feet)	7				91	139.2				
B-4 (Depth of Water = 20 feet)	9					137.6				
B-4 (Depth of Water = 20 feet)	13									0.42
B-4 (Depth of Water = 20 feet)	14					18.4	126.9	0.73		
B-4 (Depth of Water = 20 feet)	18									0.58
B-4 (Depth of Water = 20 feet)	23									1.5
B-4 (Depth of Water = 20 feet)	24					23	128.2	2.01		
B-4 (Depth of Water = 20 feet)	28									0.83

PLATE D-7

Project: Battleship Texas
Location: Houston, Texas
Project Number: HG1015021

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	% Pass #200 Sieve	Moisture Content (%)	Unit Weight (pcf)	Shear Strength (UC) (tsf)	Shear Strength (UU) (tsf)	Shear Strength (Pocket
B-4 (Depth of Water = 20 feet)	29	72	23	49						
B-4 (Depth of Water = 20 feet)	33									1.33
B-4 (Depth of Water = 20 feet)	34					25.5	124.2		1.16	
B-4 (Depth of Water = 20 feet)	38									1.5
B-4 (Depth of Water = 20 feet)	39					27.5	124.1		0.62	
B-4 (Depth of Water = 20 feet)	49				39	24.2				
B-4 (Depth of Water = 20 feet)	53									1.17
B-4 (Depth of Water = 20 feet)	54					21.7	126.4		1.17	
B-4 (Depth of Water = 20 feet)	58									1.5
B-4 (Depth of Water = 20 feet)	59	71	28	43						
B-4 (Depth of Water = 20 feet)	64				99	22.4				
B-4 (Depth of Water = 20 feet)	68									1.5
B-4 (Depth of Water = 20 feet)	69					24				
B-4 (Depth of Water = 20 feet)	73									1.17
B-4 (Depth of Water = 20 feet)	74	65	28	37		28.4				
B-4 (Depth of Water = 20 feet)	78									0.92
B-4 (Depth of Water = 20 feet)	79					31.4	109.8		0.98	
B-4 (Depth of Water = 20 feet)	83									1
B-4 (Depth of Water = 20 feet)	84				99					
B-4 (Depth of Water = 20 feet)	88									0.67
B-4 (Depth of Water = 20 feet)	89	51	23	28		35				
B-4 (Depth of Water = 20 feet)	93									0.83
B-4 (Depth of Water = 20 feet)	94					26.5	125.7		1.32	
B-4 (Depth of Water = 20 feet)	98									1.33
B-4 (Depth of Water = 20 feet)	99				95	25.5				
B-4 (Depth of Water = 20 feet)	103									1.33
B-4 (Depth of Water = 20 feet)	104	63	26	37		29.3				
B-4 (Depth of Water = 20 feet)	108									1.5
B-4 (Depth of Water = 20 feet)	109					27.3	125		2.02	
B-4 (Depth of Water = 20 feet)	114				14	26.1				

PLATE D-8

Project: Battleship Texas
Location: Houston, Texas
Project Number: HG1015021

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	% Pass #200 Sieve	Moisture Content (%)	Unit Weight (pcf)	Shear Strength (UC) (tsf)	Shear Strength (UU) (tsf)	Shear Strength (Pocket
B-4 (Depth of Water = 20 feet)	118									1.5
B-4 (Depth of Water = 20 feet)	119					32.8	117.9		1.43	
B-4 (Depth of Water = 20 feet)	123									0.75
B-4 (Depth of Water = 20 feet)	124	30	20	10		26.6				
B-4 (Depth of Water = 20 feet)	128									1.42
B-4 (Depth of Water = 20 feet)	129					31	116.6		0.88	
B-4 (Depth of Water = 20 feet)	133									1.33
B-4 (Depth of Water = 20 feet)	134				99	30.2				
B-4 (Depth of Water = 20 feet)	138									0.75
B-4 (Depth of Water = 20 feet)	139					34.8	112.3		1.5	
B-4 (Depth of Water = 20 feet)	143									1
B-4 (Depth of Water = 20 feet)	144	68	29	39		38				
B-4 (Depth of Water = 20 feet)	148									1.08
B-4 (Depth of Water = 20 feet)	149					25.5	123.6		2.05	
B-5 (Depth of Water = 17 feet)	1				90	227.9				
B-5 (Depth of Water = 17 feet)	3	84	34	50		122.4				
B-5 (Depth of Water = 17 feet)	5				91	173.2				
B-5 (Depth of Water = 17 feet)	7					149.8				
B-5 (Depth of Water = 17 feet)	8									0.08
B-5 (Depth of Water = 17 feet)	13									0.67
B-5 (Depth of Water = 17 feet)	14	51	22	29		29.3				
B-5 (Depth of Water = 17 feet)	18									0.75
B-5 (Depth of Water = 17 feet)	19					16.8	132.5	0.92		
B-5 (Depth of Water = 17 feet)	23									1.5
B-5 (Depth of Water = 17 feet)	24	35	15	20	62	16.7				
B-5 (Depth of Water = 17 feet)	28									1.08
B-5 (Depth of Water = 17 feet)	29					21.6	127.6		1.52	
B-5 (Depth of Water = 17 feet)	33									0.83
B-5 (Depth of Water = 17 feet)	34	78	33	45		35.9				
B-5 (Depth of Water = 17 feet)	38									1.17

Project: Battleship Texas
Location: Houston, Texas
Project Number: HG1015021

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	% Pass #200 Sieve	Moisture Content (%)	Unit Weight (pcf)	Shear Strength (UC) (tsf)	Shear Strength (UU) (tsf)	Shear Strength (Pocket
B-5 (Depth of Water = 17 feet)	39	56	22	34		25.2				
B-5 (Depth of Water = 17 feet)	43									1.5
B-5 (Depth of Water = 17 feet)	44					24.6	119.1		0.64	
B-5 (Depth of Water = 17 feet)	48									0.67
B-5 (Depth of Water = 17 feet)	49	36	14	22		20.2				
B-5 (Depth of Water = 17 feet)	53									1.25
B-5 (Depth of Water = 17 feet)	54					20.4	123		1.05	
B-5 (Depth of Water = 17 feet)	58									1.42
B-5 (Depth of Water = 17 feet)	59				91	22.7				
B-5 (Depth of Water = 17 feet)	63									1.5
B-5 (Depth of Water = 17 feet)	64					25.9	119.5		1.89	
B-5 (Depth of Water = 17 feet)	68									1.5
B-5 (Depth of Water = 17 feet)	69	48	21	27		20.8				
B-5 (Depth of Water = 17 feet)	73									1.5
B-5 (Depth of Water = 17 feet)	74				99	31.9				
B-5 (Depth of Water = 17 feet)	78									1.33
B-5 (Depth of Water = 17 feet)	79					31.2	110.3		1.38	
B-5 (Depth of Water = 17 feet)	83									1
B-5 (Depth of Water = 17 feet)	84	50	26	24		35.6				
B-5 (Depth of Water = 17 feet)	88									1
B-5 (Depth of Water = 17 feet)	89					35.6				
B-5 (Depth of Water = 17 feet)	93									0.58
B-5 (Depth of Water = 17 feet)	94					38.6	108.3		0.64	
B-5 (Depth of Water = 17 feet)	98									0.83
B-5 (Depth of Water = 17 feet)	99	61	26	35		30.8				
B-5 (Depth of Water = 17 feet)	103									1.5
B-5 (Depth of Water = 17 feet)	104					24.3	117.7		1.79	
B-5 (Depth of Water = 17 feet)	108									1.5
B-5 (Depth of Water = 17 feet)	109					28.6				
B-5 (Depth of Water = 17 feet)	113									1.5

Project: Battleship Texas
Location: Houston, Texas
Project Number: HG1015021

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	% Pass #200 Sieve	Moisture Content (%)	Unit Weight (pcf)	Shear Strength (UC) (tsf)	Shear Strength (UU) (tsf)	Shear Strength (Pocket
B-5 (Depth of Water = 17 feet)	114	68	32	36		30.4				
B-5 (Depth of Water = 17 feet)	118									1.5
B-5 (Depth of Water = 17 feet)	119					30.5	114.6		2.02	
B-5 (Depth of Water = 17 feet)	123									1.5
B-5 (Depth of Water = 17 feet)	124	67	29	38		30.9				
B-5 (Depth of Water = 17 feet)	128									0.75
B-5 (Depth of Water = 17 feet)	129				87	28.2				
B-5 (Depth of Water = 17 feet)	134				96	31.8				
B-5 (Depth of Water = 17 feet)	138									0.33
B-5 (Depth of Water = 17 feet)	139				98	30.3				
B-5 (Depth of Water = 17 feet)	143									0.58
B-5 (Depth of Water = 17 feet)	144					39.4	109		0.93	
B-5 (Depth of Water = 17 feet)	148									0.5
B-5 (Depth of Water = 17 feet)	149					18.5				
B-6 (Depth of Water = 16.5 feet)	1				43	30.6				
B-6 (Depth of Water = 16.5 feet)	2									0.17
B-6 (Depth of Water = 16.5 feet)	3	47	17	30		28.7				
B-6 (Depth of Water = 16.5 feet)	5				94	164				
B-6 (Depth of Water = 16.5 feet)	7	104	35	69		166.5				
B-6 (Depth of Water = 16.5 feet)	8									0.17
B-6 (Depth of Water = 16.5 feet)	9					27.9				
B-6 (Depth of Water = 16.5 feet)	13									1.5
B-6 (Depth of Water = 16.5 feet)	18									0.33
B-6 (Depth of Water = 16.5 feet)	19	24	17	7		18.4				
B-6 (Depth of Water = 16.5 feet)	23									1.5
B-6 (Depth of Water = 16.5 feet)	24					16.9	130.2		1.77	
B-6 (Depth of Water = 16.5 feet)	28									1.5
B-6 (Depth of Water = 16.5 feet)	29				90	16.5				
B-6 (Depth of Water = 16.5 feet)	33									0.33
B-6 (Depth of Water = 16.5 feet)	34	28	14	14		19.2				

Project: Battleship Texas
Location: Houston, Texas
Project Number: HG1015021

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	% Pass #200 Sieve	Moisture Content (%)	Unit Weight (pcf)	Shear Strength (UC) (tsf)	Shear Strength (UU) (tsf)	Shear Strength (Pocket
B-6 (Depth of Water = 16.5 feet)	38									1.42
B-6 (Depth of Water = 16.5 feet)	39					25.1	117.7		1.23	
B-6 (Depth of Water = 16.5 feet)	43									1.17
B-6 (Depth of Water = 16.5 feet)	44	61	27	34		26.4				
B-6 (Depth of Water = 16.5 feet)	49				97	22				
B-6 (Depth of Water = 16.5 feet)	53									1.5
B-6 (Depth of Water = 16.5 feet)	54					22.1				
B-6 (Depth of Water = 16.5 feet)	58									1.5
B-6 (Depth of Water = 16.5 feet)	59					22.4	129.8		2.08	
B-6 (Depth of Water = 16.5 feet)	63									1.5
B-6 (Depth of Water = 16.5 feet)	64	65	25	40		21.6				
B-6 (Depth of Water = 16.5 feet)	73									1.33
B-6 (Depth of Water = 16.5 feet)	74					26.9	119		1.27	
B-6 (Depth of Water = 16.5 feet)	78									1.5
B-6 (Depth of Water = 16.5 feet)	79					28.3				
B-6 (Depth of Water = 16.5 feet)	83									1
B-6 (Depth of Water = 16.5 feet)	84					36.9	114.4		1.03	
B-6 (Depth of Water = 16.5 feet)	88									0.83
B-6 (Depth of Water = 16.5 feet)	89	62	30	32		40.9				
B-6 (Depth of Water = 16.5 feet)	93									0.5
B-6 (Depth of Water = 16.5 feet)	94					31.6	113.3		0.93	
B-6 (Depth of Water = 16.5 feet)	98									0.83
B-6 (Depth of Water = 16.5 feet)	99					29.7				
B-6 (Depth of Water = 16.5 feet)	103									1.25
B-6 (Depth of Water = 16.5 feet)	104					25.6	126.1		1.55	
B-6 (Depth of Water = 16.5 feet)	108									1.5
B-6 (Depth of Water = 16.5 feet)	109	58	30	28		29.9				
B-6 (Depth of Water = 16.5 feet)	113									1.5
B-6 (Depth of Water = 16.5 feet)	114					27.4	114.2		2.09	
B-6 (Depth of Water = 16.5 feet)	118									1.33

Project: Battleship Texas
Location: Houston, Texas
Project Number: HG1015021

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	% Pass #200 Sieve	Moisture Content (%)	Unit Weight (pcf)	Shear Strength (UC) (tsf)	Shear Strength (UU) (tsf)	Shear Strength (Pocket
B-6 (Depth of Water = 16.5 feet)	119				90	25.6				
B-6 (Depth of Water = 16.5 feet)	128									1
B-6 (Depth of Water = 16.5 feet)	129	50	25	25		32.9				
B-6 (Depth of Water = 16.5 feet)	133									0.83
B-6 (Depth of Water = 16.5 feet)	134					38.3	112.8		0.93	
B-6 (Depth of Water = 16.5 feet)	138									0.83
B-6 (Depth of Water = 16.5 feet)	139				97	33.6				
Total		**58**	**58**	**58**	**51**	**192**	**70**	**9**	**61**	**171**

PLATE D-13

APPENDIX E

ENVIRONMENTAL LABORATORY TEST RESULTS

Anacon, Inc.
730 FM 1959
Houston, TX 77034
Phone: (281) 922-7000
Fax: (281) 481-0089

HVJ Associates		**ANACON NUMBER**	1012089
6120 S. Dairy Ashford		**DATE COLLECTED**	12/08/10
Houston, TX 77072		**DATE RECEIVED**	12/09/10
ATTN: Ed Hawkinson		**DATE OF REPORT**	01/04/11
LAB ID:	1012089-001A	**SAMPLE MATRIX:**	SEDIMENT
SAMPLE ID:	BT1 (BOW)	**PROJECT:**	HG1015021

PARAMETER	METHOD	DATE ANALYZED	CRDL (mg/Kg)	RESULT (mg/Kg)
METALS	-	-	-	-
Antimony	6020	12/15/10	2.50	<2.50
Arsenic	6020	12/15/10	0.30	5.14
Beryllium	6020	12/15/10	1.00	<1.00
Cadmium	6020	12/15/10	0.10	<0.10
Chromium, Total	6020	12/15/10	1.00	16.6
Chromium, Trivalent	6020	12/15/10	1.00	16.6
Chromium, Hexavalent	6020	12/09/10	1.00	<1.00
Copper	6020	12/15/10	1.00	29.3
Lead	6020	12/15/10	0.30	33.2
Mercury	6020	12/15/10	0.20	0.46
Nickel	6020	12/15/10	0.50	14.9
Selenium	6020	12/15/10	0.50	<0.50
Silver	6020	12/15/10	0.20	<0.20
Thallium	6020	12/15/10	0.20	<0.20
Zinc	6020	12/15/10	2.00	161

PARAMETER	METHOD	DATE ANALYZED	CRDL (ug/Kg)	RESULT (ug/Kg)
Pesticides / PCBs	-	-	-	-
Aldrin	8081A	12/13/10	3.00	<3.00
Alpha - BHC	8081A	12/13/10	3.00	<3.00
Beta - BHC	8081A	12/13/10	3.00	<3.00
Gamma - BHC	8081A	12/13/10	3.00	<3.00
Delta - BHC	8081A	12/13/10	3.00	<3.00
4,4'-DDD	8081A	12/13/10	5.00	<5.00
4,4'-DDE	8081A	12/13/10	5.00	<5.00
4,4'-DDT	8081A	12/13/10	5.00	<5.00
Heptachlor	8081A	12/13/10	3.00	<3.00

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Phone: (281) 922-7000
Fax: (281) 481-0089

PARAMETER	METHOD	DATE ANALYZED	CRDL (ug/Kg)	RESULT (ug/Kg)
Pesticides / PCBs	-	-	-	-
Dieldrin	8081A	12/13/10	5.00	<5.00
Endosulfan I	8081A	12/13/10	5.00	<5.00
Endosulfan II	8081A	12/13/10	5.00	<5.00
Endosulfan Sulfate	8081A	12/13/10	5.00	<5.00
Endrin	8081A	12/13/10	5.00	<5.00
Endrin Aldehyde	8081A	12/13/10	5.00	<5.00
Heptachlor Epoxide	8081A	12/13/10	3.00	<3.00
Chlordane	8081A	12/13/10	3.00	<3.00
Toxaphene	8081A	12/13/10	50.0	<50.0
Alpha - Chlordane	8081A	12/13/10	3.00	<3.00
Gamma - Chlordane	8081A	12/13/10	3.00	<3.00
Total PCBs	8082	12/13/10	1.00	<1.00

PARAMETER	METHOD	DATE ANALYZED	CRDL (ug/Kg)	RESULT (ug/Kg)
Semivolatiles	-	-	-	-
Phenol	8270C	12/14/10	100	<100
2-Chlorophenol	8270C	12/14/10	110	<110
2-Nitrophenol	8270C	12/14/10	200	<200
2,4-Dimethylphenol	8270C	12/14/10	20.0	<20.0
2,4-Dichlorophenol	8270C	12/14/10	120	<120
4-Chloro-3-methylphenol	8270C	12/14/10	140	<140
2,4,6-Trichlorophenol	8270C	12/14/10	140	<140
2,4-Dinitrophenol	8270C	12/14/10	500	<500
4-Nitrophenol	8270C	12/14/10	500	<500
2-Methyl-4,6-dinitrophenol	8270C	12/14/10	600	<600
Pentachlorophenol	8270C	12/14/10	100	<100
N-Nitrosodimethylamine	8270C	12/14/10	20.0	<20.0
Bis (2-Chloroisopropy) Ether	8270C	12/14/10	140	<140
N-Nitroso-di-n-Propylamine	8270C	12/14/10	150	<150
Nitrobenzene	8270C	12/14/10	160	<160
Isophrone	8270C	12/14/10	10.0	<10.0
Bis (2-Chloroethoxy) Methane	8270C	12/14/10	130	<130
2,6-Dinitrotoluene	8270C	12/14/10	200	<200
2,4-Dinitrotoluene	8270C	12/14/10	200	<200
Benzidine	8270C	12/14/10	5.00	<5.00
3,3-Dichlorobenzidine	8270C	12/14/10	300	<300
Bis (2-Chloroethyl) Ether	8270C	12/14/10	130	<130
1,3-Dichlorobenzene	8270C	12/14/10	20.0	<20.0
1,4-Dichlorobenzene	8270C	12/14/10	20.0	<20.0
1,2-Dichlorobenzene	8270C	12/14/10	20.0	<20.0
Hexachloroethane	8270C	12/14/10	100	<100
1,2,4-Trichlorobenzene	8270C	12/14/10	10.0	<10.0
Naphthalene	8270C	12/14/10	20.0	<20.0

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PARAMETER	METHOD	DATE ANALYZED	CRDL (ug/Kg)	RESULT (ug/Kg)
Semivolatiles	-	-	-	-
Hexachlorobutadiene	8270C	12/14/10	20.0	<20.0
Hexachlorocyclopentadiene	8270C	12/14/10	300	<300
2-Chloronapthalene	8270C	12/14/10	160	<160
Acenapthylene	8270C	12/14/10	20.0	<20.0
Dimethyl Phthalate	8270C	12/14/10	50.0	<50.0
Acenaphthene	8270C	12/14/10	20.0	<20.0
Fluorene	8270C	12/14/10	20.0	<20.0
Diethyl Phthalate	8270C	12/14/10	50.0	499
4-Chlorophenyl Phenyl Ether	8270C	12/14/10	170	<170
N-Nitrosodiphenyl Amine	8270C	12/14/10	20.0	<20.0
4-Bromophenyl Ether	8270C	12/14/10	160	<160
Hexachlorobenzene	8270C	12/14/10	10.0	<10.0
Phenanthrene	8270C	12/14/10	20.0	<20.0
Anthracene	8270C	12/14/10	20.0	<20.0
Dibutylphthalate	8270C	12/14/10	50.0	813
Fluoranthene	8270C	12/14/10	20.0	31.1
Pyrene	8270C	12/14/10	20.0	<20.0
Butylbenzylphthalate	8270C	12/14/10	50.0	<50.0
Chrysene	8270C	12/14/10	20.0	<20.0
Benzo (a) Anthracene	8270C	12/14/10	20.0	<20.0
Bis (2-Ethylhexyl) Phthalate	8270C	12/14/10	50.0	265
Di-N-Octylphthalate	8270C	12/14/10	50.0	<50.0
Benzo (b) Fluoranthene	8270C	12/14/10	20.0	30.3
Benzo (k) Fluoranthene	8270C	12/14/10	20.0	<20.0
1,2-Diphenylhydrazine	8270C	12/14/10	10.0	<10.0
Benzo (a) Pyrene	8270C	12/14/10	20.0	43.6
Indeno (1,2,3-c,d) Pyrene	8270C	12/14/10	20.0	<20.0
Dibenzo (a,h) Anthracene	8270C	12/14/10	20.0	<20.0
Benzo (ghi) Perylene	8270C	12/14/10	20.0	<20.0

PARAMETER	METHOD	DATE ANALYZED	CRDL (mg/Kg)	RESULT (mg/Kg)
Miscellaneous	-	-	-	-
Ammonia (as N)	350.3	12/16/10	0.10	246
Cyanide	SM-4500 CN-	12/13/10	2.00	<2.00
Total Organic Carbon	9060	12/14/10	0.10%	0.51%
Total Petroleum Hydrocarbons	8021	12/13/10	5.00	<5.00
% Solids	160.3	12/13/10	-	28.0%

*Sample results are in dry weight.

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HVJ Associates		**ANACON NUMBER**	1012089
6120 S. Dairy Ashford		**DATE COLLECTED**	12/08/10
Houston, TX 77072		**DATE RECEIVED**	12/09/10
ATTN: Ed Hawkinson		**DATE OF REPORT**	01/04/11
LAB ID:	1012089-002A	**SAMPLE MATRIX:**	SEDIMENT
SAMPLE ID:	BT2 (STERN)	**PROJECT:**	HG1015021

PARAMETER	METHOD	DATE ANALYZED	CRDL (mg/Kg)	RESULT (mg/Kg)
METALS	-	-	-	-
Antimony	6020	12/15/10	2.50	<2.50
Arsenic	6020	12/15/10	0.30	11.6
Beryllium	6020	12/15/10	1.00	<1.00
Cadmium	6020	12/15/10	0.10	0.47
Chromium, Total	6020	12/15/10	1.00	19.1
Chromium, Trivalent	6020	12/15/10	1.00	19.1
Chromium, Hexavalent	6020	12/09/10	1.00	<1.00
Copper	6020	12/15/10	1.00	30.2
Lead	6020	12/15/10	0.30	34.5
Mercury	6020	12/15/10	0.20	<0.20
Nickel	6020	12/15/10	0.50	17.5
Selenium	6020	12/15/10	0.50	<0.50
Silver	6020	12/15/10	0.20	<0.20
Thallium	6020	12/15/10	0.20	<0.20
Zinc	6020	12/15/10	2.00	153

PARAMETER	METHOD	DATE ANALYZED	CRDL (ug/Kg)	RESULT (ug/Kg)
Pesticides / PCBs	-	-	-	-
Aldrin	8081A	12/13/10	3.00	<3.00
Alpha - BHC	8081A	12/13/10	3.00	<3.00
Beta - BHC	8081A	12/13/10	3.00	<3.00
Gamma - BHC	8081A	12/13/10	3.00	<3.00
Delta - BHC	8081A	12/13/10	3.00	<3.00
4,4'-DDD	8081A	12/13/10	5.00	<5.00
4,4'-DDE	8081A	12/13/10	5.00	<5.00
4,4'-DDT	8081A	12/13/10	5.00	<5.00
Heptachlor	8081A	12/13/10	3.00	<3.00

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PARAMETER	METHOD	DATE ANALYZED	CRDL (ug/Kg)	RESULT (ug/Kg)
Pesticides / PCBs	-	-	-	-
Dieldrin	8081A	12/13/10	5.00	<5.00
Endosulfan I	8081A	12/13/10	5.00	<5.00
Endosulfan II	8081A	12/13/10	5.00	<5.00
Endosulfan Sulfate	8081A	12/13/10	5.00	<5.00
Endrin	8081A	12/13/10	5.00	<5.00
Endrin Aldehyde	8081A	12/13/10	5.00	<5.00
Heptachlor Epoxide	8081A	12/13/10	3.00	<3.00
Chlordane	8081A	12/13/10	3.00	<3.00
Toxaphene	8081A	12/13/10	50.0	<50.0
Alpha - Chlordane	8081A	12/13/10	3.00	<3.00
Gamma - Chlordane	8081A	12/13/10	3.00	<3.00
Total PCBs	8082	12/13/10	1.00	<1.00

PARAMETER	METHOD	DATE ANALYZED	CRDL (ug/Kg)	RESULT (ug/Kg)
Semivolatiles	-	-	-	-
Phenol	8270C	12/14/10	100	<100
2-Chlorophenol	8270C	12/14/10	110	<110
2-Nitrophenol	8270C	12/14/10	200	<200
2,4-Dimethylphenol	8270C	12/14/10	20.0	<20.0
2,4-Dichlorophenol	8270C	12/14/10	120	<120
4-Chloro-3-methylphenol	8270C	12/14/10	140	<140
2,4,6-Trichlorophenol	8270C	12/14/10	140	<140
2,4-Dinitrophenol	8270C	12/14/10	500	<500
4-Nitrophenol	8270C	12/14/10	500	<500
2-Methyl-4,6-dinitrophenol	8270C	12/14/10	600	<600
Pentachlorophenol	8270C	12/14/10	100	<100
N-Nitrosodimethylamine	8270C	12/14/10	20.0	<20.0
Bis (2-Chloroisopropy) Ether	8270C	12/14/10	140	<140
N-Nitroso-di-n-Propylamine	8270C	12/14/10	150	<150
Nitrobenzene	8270C	12/14/10	160	<160
Isophrone	8270C	12/14/10	10.0	<10.0
Bis (2-Chloroethoxy) Methane	8270C	12/14/10	130	<130
2,6-Dinitrotoluene	8270C	12/14/10	200	<200
2,4-Dinitrotoluene	8270C	12/14/10	200	<200
Benzidine	8270C	12/14/10	5.00	<5.00
3,3-Dichlorobenzidine	8270C	12/14/10	300	<300
Bis (2-Chloroethyl) Ether	8270C	12/14/10	130	<130
1,3-Dichlorobenzene	8270C	12/14/10	20.0	<20.0
1,4-Dichlorobenzene	8270C	12/14/10	20.0	<20.0
1,2-Dichlorobenzene	8270C	12/14/10	20.0	<20.0
Hexachloroethane	8270C	12/14/10	100	<100
1,2,4-Trichlorobenzene	8270C	12/14/10	10.0	<10.0
Naphthalene	8270C	12/14/10	20.0	<20.0

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PARAMETER	METHOD	DATE ANALYZED	CRDL (ug/Kg)	RESULT (ug/Kg)
Semivolatiles	-	-	-	-
Hexachlorobutadiene	8270C	12/14/10	20.0	<20.0
Hexachlorocyclopentadiene	8270C	12/14/10	300	<300
2-Chloronapthalene	8270C	12/14/10	160	<160
Acenapthylene	8270C	12/14/10	20.0	<20.0
Dimethyl Phthalate	8270C	12/14/10	50.0	<50.0
Acenaphthene	8270C	12/14/10	20.0	<20.0
Fluorene	8270C	12/14/10	20.0	<20.0
Diethyl Phthalate	8270C	12/14/10	50.0	205
4-Chlorophenyl Phenyl Ether	8270C	12/14/10	170	<170
N-Nitrosodiphenyl Amine	8270C	12/14/10	20.0	<20.0
4-Bromophenyl Ether	8270C	12/14/10	160	<160
Hexachlorobenzene	8270C	12/14/10	10.0	<10.0
Phenanthrene	8270C	12/14/10	20.0	<20.0
Anthracene	8270C	12/14/10	20.0	<20.0
Dibutylphthalate	8270C	12/14/10	50.0	340
Fluoranthene	8270C	12/14/10	20.0	44.3
Pyrene	8270C	12/14/10	20.0	<20.0
Butylbenzylphthalate	8270C	12/14/10	50.0	<50.0
Chrysene	8270C	12/14/10	20.0	31.0
Benzo (a) Anthracene	8270C	12/14/10	20.0	<20.0
Bis (2-Ethylhexyl) Phthalate	8270C	12/14/10	50.0	305
Di-N-Octylphthalate	8270C	12/14/10	50.0	<50.0
Benzo (b) Fluoranthene	8270C	12/14/10	20.0	62.6
Benzo (k) Fluoranthene	8270C	12/14/10	20.0	30.8
1,2-Diphenylhydrazine	8270C	12/14/10	10.0	<10.0
Benzo (a) Pyrene	8270C	12/14/10	20.0	45.6
Indeno (1,2,3-c,d) Pyrene	8270C	12/14/10	20.0	<20.0
Dibenzo (a,h) Anthracene	8270C	12/14/10	20.0	<20.0
Benzo (ghi) Perylene	8270C	12/14/10	20.0	20.7

PARAMETER	METHOD	DATE ANALYZED	CRDL (mg/Kg)	RESULT (mg/Kg)
Miscellaneous	-	-	-	-
Ammonia (as N)	350.3	12/16/10	0.10	253
Cyanide	SM-4500 CN-	12/13/10	2.00	<2.00
Total Organic Carbon	9060	12/14/10	0.10%	0.55%
Total Petroleum Hydrocarbons	8021	12/13/10	5.00	<5.00
% Solids	160.3	12/13/10	-	31.8%

*Sample results are in dry weight.

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HVJ Associates		**ANACON NUMBER**	1012089
6120 S. Dairy Ashford		**DATE COLLECTED**	12/08/10
Houston, TX 77072		**DATE RECEIVED**	12/09/10
ATTN: Ed Hawkinson		**DATE OF REPORT**	01/04/11
LAB ID:	1012089-003A	**SAMPLE MATRIX:**	SEDIMENT
SAMPLE ID:	BT3 (PORT)	**PROJECT:**	HG1015021

PARAMETER	METHOD	DATE ANALYZED	CRDL (mg/Kg)	RESULT (mg/Kg)
METALS	-	-	-	-
Antimony	6020	12/15/10	2.50	<2.50
Arsenic	6020	12/15/10	0.30	6.50
Beryllium	6020	12/15/10	1.00	<1.00
Cadmium	6020	12/15/10	0.10	0.47
Chromium, Total	6020	12/15/10	1.00	18.9
Chromium, Trivalent	6020	12/15/10	1.00	18.9
Chromium, Hexavalent	6020	12/09/10	1.00	<1.00
Copper	6020	12/15/10	1.00	32.1
Lead	6020	12/15/10	0.30	36.0
Mercury	6020	12/15/10	0.20	<0.20
Nickel	6020	12/15/10	0.50	16.3
Selenium	6020	12/15/10	0.50	<0.50
Silver	6020	12/15/10	0.20	<0.20
Thallium	6020	12/15/10	0.20	<0.20
Zinc	6020	12/15/10	2.00	167

PARAMETER	METHOD	DATE ANALYZED	CRDL (ug/Kg)	RESULT (ug/Kg)
Pesticides / PCBs	-	-	-	-
Aldrin	8081A	12/13/10	3.00	<3.00
Alpha - BHC	8081A	12/13/10	3.00	<3.00
Beta - BHC	8081A	12/13/10	3.00	<3.00
Gamma - BHC	8081A	12/13/10	3.00	<3.00
Delta - BHC	8081A	12/13/10	3.00	<3.00
4,4'-DDD	8081A	12/13/10	5.00	<5.00
4,4'-DDE	8081A	12/13/10	5.00	<5.00
4,4'-DDT	8081A	12/13/10	5.00	<5.00
Heptachlor	8081A	12/13/10	3.00	<3.00

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PARAMETER	METHOD	DATE ANALYZED	CRDL (ug/Kg)	RESULT (ug/Kg)
Pesticides / PCBs	-	-	-	-
Dieldrin	8081A	12/13/10	5.00	<5.00
Endosulfan I	8081A	12/13/10	5.00	<5.00
Endosulfan II	8081A	12/13/10	5.00	<5.00
Endosulfan Sulfate	8081A	12/13/10	5.00	<5.00
Endrin	8081A	12/13/10	5.00	<5.00
Endrin Aldehyde	8081A	12/13/10	5.00	<5.00
Heptachlor Epoxide	8081A	12/13/10	3.00	<3.00
Chlordane	8081A	12/13/10	3.00	<3.00
Toxaphene	8081A	12/13/10	50.0	<50.0
Alpha - Chlordane	8081A	12/13/10	3.00	<3.00
Gamma - Chlordane	8081A	12/13/10	3.00	<3.00
Total PCBs	8082	12/13/10	1.00	<1.00

PARAMETER	METHOD	DATE ANALYZED	CRDL (ug/Kg)	RESULT (ug/Kg)
Semivolatiles	-	-	-	-
Phenol	8270C	12/14/10	100	<100
2-Chlorophenol	8270C	12/14/10	110	<110
2-Nitrophenol	8270C	12/14/10	200	<200
2,4-Dimethylphenol	8270C	12/14/10	20.0	<20.0
2,4-Dichlorophenol	8270C	12/14/10	120	<120
4-Chloro-3-methylphenol	8270C	12/14/10	140	<140
2,4,6-Trichlorophenol	8270C	12/14/10	140	<140
2,4-Dinitrophenol	8270C	12/14/10	500	<500
4-Nitrophenol	8270C	12/14/10	500	<500
2-Methyl-4,6-dinitrophenol	8270C	12/14/10	600	<600
Pentachlorophenol	8270C	12/14/10	100	<100
N-Nitrosodimethylamine	8270C	12/14/10	20.0	<20.0
Bis (2-Chloroisopropy) Ether	8270C	12/14/10	140	<140
N-Nitroso-di-n-Propylamine	8270C	12/14/10	150	<150
Nitrobenzene	8270C	12/14/10	160	<160
Isophrone	8270C	12/14/10	10.0	<10.0
Bis (2-Chloroethoxy) Methane	8270C	12/14/10	130	<130
2,6-Dinitrotoluene	8270C	12/14/10	200	<200
2,4-Dinitrotoluene	8270C	12/14/10	200	<200
Benzidine	8270C	12/14/10	5.00	<5.00
3,3-Dichlorobenzidine	8270C	12/14/10	300	<300
Bis (2-Chloroethyl) Ether	8270C	12/14/10	130	<130
1,3-Dichlorobenzene	8270C	12/14/10	20.0	<20.0
1,4-Dichlorobenzene	8270C	12/14/10	20.0	<20.0
1,2-Dichlorobenzene	8270C	12/14/10	20.0	<20.0
Hexachloroethane	8270C	12/14/10	100	<100
1,2,4-Trichlorobenzene	8270C	12/14/10	10.0	<10.0
Naphthalene	8270C	12/14/10	20.0	<20.0

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PARAMETER	METHOD	DATE ANALYZED	CRDL (ug/Kg)	RESULT (ug/Kg)
Semivolatiles	-	-	-	-
Hexachlorobutadiene	8270C	12/14/10	20.0	<20.0
Hexachlorocyclopentadiene	8270C	12/14/10	300	<300
2-Chloronapthalene	8270C	12/14/10	160	<160
Acenapthylene	8270C	12/14/10	20.0	<20.0
Dimethyl Phthalate	8270C	12/14/10	50.0	<50.0
Acenaphthene	8270C	12/14/10	20.0	<20.0
Fluorene	8270C	12/14/10	20.0	<20.0
Diethyl Phthalate	8270C	12/14/10	50.0	202
4-Chlorophenyl Phenyl Ether	8270C	12/14/10	170	<170
N-Nitrosodiphenyl Amine	8270C	12/14/10	20.0	<20.0
4-Bromophenyl Ether	8270C	12/14/10	160	<160
Hexachlorobenzene	8270C	12/14/10	10.0	<10.0
Phenanthrene	8270C	12/14/10	20.0	<20.0
Anthracene	8270C	12/14/10	20.0	<20.0
Dibutylphthalate	8270C	12/14/10	50.0	345
Fluoranthene	8270C	12/14/10	20.0	44.6
Pyrene	8270C	12/14/10	20.0	<20.0
Butylbenzylphthalate	8270C	12/14/10	50.0	<50.0
Chrysene	8270C	12/14/10	20.0	<20.0
Benzo (a) Anthracene	8270C	12/14/10	20.0	<20.0
Bis (2-Ethylhexyl) Phthalate	8270C	12/14/10	50.0	183
Di-N-Octylphthalate	8270C	12/14/10	50.0	<50.0
Benzo (b) Fluoranthene	8270C	12/14/10	20.0	54.7
Benzo (k) Fluoranthene	8270C	12/14/10	20.0	20.3
1,2-Diphenylhydrazine	8270C	12/14/10	10.0	<10.0
Benzo (a) Pyrene	8270C	12/14/10	20.0	<20.0
Indeno (1,2,3-c,d) Pyrene	8270C	12/14/10	20.0	<20.0
Dibenzo (a,h) Anthracene	8270C	12/14/10	20.0	<20.0
Benzo (ghi) Perylene	8270C	12/14/10	20.0	20.3

PARAMETER	METHOD	DATE ANALYZED	CRDL (mg/Kg)	RESULT (mg/Kg)
Miscellaneous	-	-	-	-
Ammonia (as N)	350.3	12/16/10	0.10	266
Cyanide	SM-4500 CN-	12/13/10	2.00	<2.00
Total Organic Carbon	9060	12/14/10	0.10%	0.44%
Total Petroleum Hydrocarbons	8021	12/13/10	5.00	<5.00
% Solids	160.3	12/13/10	-	30.3%

*Sample results are in dry weight.

Anacon, Inc.
730 FM 1959
Houston, TX 77034
Phone: (281) 922-7000
Fax: (281) 481-0089

HVJ Associates		**ANACON NUMBER**	1012089
6120 S. Dairy Ashford		**DATE COLLECTED**	12/08/10
Houston, TX 77072		**DATE RECEIVED**	12/09/10
ATTN: Ed Hawkinson		**DATE OF REPORT**	01/04/11
LAB ID:	1012089-004A	**SAMPLE MATRIX:**	SEDIMENT
SAMPLE ID:	BT4 (STARBOARD)	**PROJECT:**	HG1015021

PARAMETER	METHOD	DATE ANALYZED	CRDL (mg/Kg)	RESULT (mg/Kg)
METALS	-	-	-	-
Antimony	6020	12/15/10	2.50	<2.50
Arsenic	6020	12/15/10	0.30	7.09
Beryllium	6020	12/15/10	1.00	<1.00
Cadmium	6020	12/15/10	0.10	0.38
Chromium, Total	6020	12/15/10	1.00	16.6
Chromium, Trivalent	6020	12/15/10	1.00	16.6
Chromium, Hexavalent	6020	12/09/10	1.00	<1.00
Copper	6020	12/15/10	1.00	28.5
Lead	6020	12/15/10	0.30	116
Mercury	6020	12/15/10	0.20	<0.20
Nickel	6020	12/15/10	0.50	14.5
Selenium	6020	12/15/10	0.50	<0.50
Silver	6020	12/15/10	0.20	<0.20
Thallium	6020	12/15/10	0.20	<0.20
Zinc	6020	12/15/10	2.00	167

PARAMETER	METHOD	DATE ANALYZED	CRDL (ug/Kg)	RESULT (ug/Kg)
Pesticides / PCBs	-	-	-	-
Aldrin	8081A	12/13/10	3.00	<3.00
Alpha - BHC	8081A	12/13/10	3.00	<3.00
Beta - BHC	8081A	12/13/10	3.00	<3.00
Gamma - BHC	8081A	12/13/10	3.00	<3.00
Delta - BHC	8081A	12/13/10	3.00	<3.00
4,4'-DDD	8081A	12/13/10	5.00	<5.00
4,4'-DDE	8081A	12/13/10	5.00	<5.00
4,4'-DDT	8081A	12/13/10	5.00	<5.00
Heptachlor	8081A	12/13/10	3.00	<3.00

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PARAMETER	METHOD	DATE ANALYZED	CRDL (ug/Kg)	RESULT (ug/Kg)
Pesticides / PCBs	-	-	-	-
Dieldrin	8081A	12/13/10	5.00	<5.00
Endosulfan I	8081A	12/13/10	5.00	<5.00
Endosulfan II	8081A	12/13/10	5.00	<5.00
Endosulfan Sulfate	8081A	12/13/10	5.00	<5.00
Endrin	8081A	12/13/10	5.00	<5.00
Endrin Aldehyde	8081A	12/13/10	5.00	<5.00
Heptachlor Epoxide	8081A	12/13/10	3.00	<3.00
Chlordane	8081A	12/13/10	3.00	<3.00
Toxaphene	8081A	12/13/10	50.0	<50.0
Alpha - Chlordane	8081A	12/13/10	3.00	<3.00
Gamma - Chlordane	8081A	12/13/10	3.00	<3.00
Total PCBs	8082	12/13/10	1.00	<1.00

PARAMETER	METHOD	DATE ANALYZED	CRDL (ug/Kg)	RESULT (ug/Kg)
Semivolatiles	-	-	-	-
Phenol	8270C	12/14/10	100	<100
2-Chlorophenol	8270C	12/14/10	110	<110
2-Nitrophenol	8270C	12/14/10	200	<200
2,4-Dimethylphenol	8270C	12/14/10	20.0	<20.0
2,4-Dichlorophenol	8270C	12/14/10	120	<120
4-Chloro-3-methylphenol	8270C	12/14/10	140	<140
2,4,6-Trichlorophenol	8270C	12/14/10	140	<140
2,4-Dinitrophenol	8270C	12/14/10	500	<500
4-Nitrophenol	8270C	12/14/10	500	<500
2-Methyl-4,6-dinitrophenol	8270C	12/14/10	600	<600
Pentachlorophenol	8270C	12/14/10	100	<100
N-Nitrosodimethylamine	8270C	12/14/10	20.0	<20.0
Bis (2-Chloroisopropy) Ether	8270C	12/14/10	140	<140
N-Nitroso-di-n-Propylamine	8270C	12/14/10	150	<150
Nitrobenzene	8270C	12/14/10	160	<160
Isophrone	8270C	12/14/10	10.0	<10.0
Bis (2-Chloroethoxy) Methane	8270C	12/14/10	130	<130
2,6-Dinitrotoluene	8270C	12/14/10	200	<200
2,4-Dinitrotoluene	8270C	12/14/10	200	<200
Benzidine	8270C	12/14/10	5.00	<5.00
3,3-Dichlorobenzidine	8270C	12/14/10	300	<300
Bis (2-Chloroethyl) Ether	8270C	12/14/10	130	<130
1,3-Dichlorobenzene	8270C	12/14/10	20.0	<20.0
1,4-Dichlorobenzene	8270C	12/14/10	20.0	<20.0
1,2-Dichlorobenzene	8270C	12/14/10	20.0	<20.0
Hexachloroethane	8270C	12/14/10	100	<100
1,2,4-Trichlorobenzene	8270C	12/14/10	10.0	<10.0
Naphthalene	8270C	12/14/10	20.0	<20.0

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PARAMETER	METHOD	DATE ANALYZED	CRDL (ug/Kg)	RESULT (ug/Kg)
Semivolatiles	-	-	-	-
Hexachlorobutadiene	8270C	12/14/10	20.0	<20.0
Hexachlorocyclopentadiene	8270C	12/14/10	300	<300
2-Chloronapthalene	8270C	12/14/10	160	<160
Acenapthylene	8270C	12/14/10	20.0	<20.0
Dimethyl Phthalate	8270C	12/14/10	50.0	<50.0
Acenaphthene	8270C	12/14/10	20.0	<20.0
Fluorene	8270C	12/14/10	20.0	<20.0
Diethyl Phthalate	8270C	12/14/10	50.0	255
4-Chlorophenyl Phenyl Ether	8270C	12/14/10	170	<170
N-Nitrosodiphenyl Amine	8270C	12/14/10	20.0	<20.0
4-Bromophenyl Ether	8270C	12/14/10	160	<160
Hexachlorobenzene	8270C	12/14/10	10.0	<10.0
Phenanthrene	8270C	12/14/10	20.0	<20.0
Anthracene	8270C	12/14/10	20.0	<20.0
Dibutylphthalate	8270C	12/14/10	50.0	313
Fluoranthene	8270C	12/14/10	20.0	21.8
Pyrene	8270C	12/14/10	20.0	<20.0
Butylbenzylphthalate	8270C	12/14/10	50.0	<50.0
Chrysene	8270C	12/14/10	20.0	<20.0
Benzo (a) Anthracene	8270C	12/14/10	20.0	<20.0
Bis (2-Ethylhexyl) Phthalate	8270C	12/14/10	50.0	<50.0
Di-N-Octylphthalate	8270C	12/14/10	50.0	<50.0
Benzo (b) Fluoranthene	8270C	12/14/10	20.0	<20.0
Benzo (k) Fluoranthene	8270C	12/14/10	20.0	21.8
1,2-Diphenylhydrazine	8270C	12/14/10	10.0	<10.0
Benzo (a) Pyrene	8270C	12/14/10	20.0	37.0
Indeno (1,2,3-c,d) Pyrene	8270C	12/14/10	20.0	<20.0
Dibenzo (a,h) Anthracene	8270C	12/14/10	20.0	<20.0
Benzo (ghi) Perylene	8270C	12/14/10	20.0	<20.0

PARAMETER	METHOD	DATE ANALYZED	CRDL (mg/Kg)	RESULT (mg/Kg)
Miscellaneous	-	-	-	-
Ammonia (as N)	350.3	12/16/10	0.10	294
Cyanide	SM-4500 CN-	12/13/10	2.00	<2.00
Total Organic Carbon	9060	12/14/10	0.10%	0.62%
Total Petroleum Hydrocarbons	8021	12/13/10	5.00	<5.00
% Solids	160.3	12/13/10	-	26.7%

*Sample results are in dry weight.

ANACON, INC.

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HOUSTON, TX 77034
(281) 922-7000 Tel.
(281) 481-0089 Fax

Chain of Custody Record

Page 1 of 1

ORIGINAL

Contact Person: ED HAWKINSON
Anacon Log Number: 1012089
Client: HNJ ASSOCIATES FOR AECOM
Phone Number: (281) 983-8829
Due Date:
Fax Number: (281) 933-7293
Turn Around Time: STANDARD

Delivered By: River Oaks #12
Custody Seal (Y/N): .
Temperature: On ice 2.1°C

Sampled By: ED HAWKINSON (Please Print)

Log Number	Sample Matrix	Date/Time Collected	Number of Containers	Client Sample ID	COE PARAMETERS (NO GRAIN SIZE)	pH	Remarks
01A	S	12/8/10 10:30	1	BT1 (BOW)	X		
02A	S	12/8/10 10:45	1	BT2 (STERN)	X		
03A	S	12/8/10 11:30	1	BT3 (PORT)	X		
04A	S	12/8/10 12:30	1	BT4 (STARBOARD)	X		

Type of Analysis Requested

FOR YOUR INVOICE:
PO No. 10-345
PROJ. No. HG10152024

Relinquished By	Date	Time	Relinquished By	Date	Time
ED HAWKINSON					
Accepted By: Natasha Warren	Date: 12/9/10	Time: 8:05AM	Accepted By:	Date:	Time:
Relinquished By: Natasha Warren	Date: 12/9/10	Time: 8:29AM	Relinquished By:	Date:	Time:
Accepted By: Whitehouse Materials Inc.	Date: 12/9/10	Time: 8:29AM	Accepted By: C. Culpe	Date: 12-9-10	Time: 11:15am

Anacon, Inc.

Date: *23-Dec-10*

ANALYTICAL QC SUMMARY REPORT

CLIENT: HVJ Associates
Work Order: 1012089
Project: PO# 10-345 Project: HG1015021

TestCode: 6020_S

Sample ID: **BLK121510JS-3** SampType: **MBLK** TestCode: **6020_S** Units: **mg/Kg** Prep Date: Run ID: **ICP-MS #1_101215C**
Client ID: **ZZZZZ** Batch ID: **R28210** TestNo: **SW6020** Analysis **12/15/2010** SeqNo: **344866**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	ND	0.100									
Arsenic	ND	0.100									
Beryllium	ND	0.100									
Cadmium	ND	0.100									
Chromium	0.1277	0.100									
Copper	0.2644	0.100									
Lead	0.2259	0.100									
Mercury	0.02472	0.0500									J
Nickel	0.1598	0.100									
Selenium	ND	0.100									
Silver	ND	0.0500									
Thallium	ND	0.100									
Zinc	1.049	0.100									

Sample ID: **LCS121510JS-3** SampType: **LCS** TestCode: **6020_S** Units: **mg/Kg** Prep Date: Run ID: **ICP-MS #1_101215C**
Client ID: **ZZZZZ** Batch ID: **R28210** TestNo: **SW6020** Analysis **12/15/2010** SeqNo: **344867**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	11.32	0.100	10	0	113	75	125	0	0		
Arsenic	9.869	0.100	10	0	98.7	75	125	0	0		
Beryllium	10.82	0.100	10	0	108	75	125	0	0		
Cadmium	10.03	0.100	10	0	100	75	125	0	0		
Chromium	11.76	0.100	10	0.1277	116	75	125	0	0		
Copper	11.45	0.100	10	0.2644	112	75	125	0	0		
Lead	11.32	0.100	10	0.2259	111	75	125	0	0		
Mercury	0.2225	0.0500	0.2	0.02472	98.9	75	125	0	0		
Nickel	11.36	0.100	10	0.1598	112	75	125	0	0		
Selenium	9.557	0.100	10	0	95.6	75	125	0	0		
Silver	5.311	0.0500	5	0	106	75	125	0	0		
Thallium	10.92	0.100	10	0	109	75	125	0	0		

Qualifiers: ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method

CLIENT: HVJ Associates
Work Order: 1012089
Project: PO# 10-345 Project: HG1015021

ANALYTICAL QC SUMMARY REPORT

TestCode: 6020_S

Sample ID: **LCS121510JS-3** SampType: **LCS** TestCode: **6020_S** Units: **mg/Kg** Prep Date: Run ID: **ICP-MS #1_101215C**
Client ID: **ZZZZZ** Batch ID: **R28210** TestNo: **SW6020** Analysis **12/15/2010** SeqNo: **344867**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Zinc	10.81	0.100	10	1.049	97.6	75	125	0	0		

Sample ID: **1012089-001A-MS** SampType: **MS** TestCode: **6020_S** Units: **mg/Kg** Prep Date: Run ID: **ICP-MS #1_101215C**
Client ID: **BT 1 (Bow)** Batch ID: **R28210** TestNo: **SW6020** Analysis **12/15/2010** SeqNo: **344870**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	1.553	0.100	10	1.035	5.18	70	130	0	0		S
Arsenic	10.67	0.100	10	1.436	92.3	70	130	0	0		
Beryllium	9.872	0.100	10	0.2787	95.9	70	130	0	0		
Cadmium	8.98	0.100	10	0.08918	88.9	70	130	0	0		
Chromium	15.38	0.100	10	4.644	107	70	130	0	0		
Copper	17.58	0.100	10	8.196	93.8	70	130	0	0		
Lead	18.11	0.100	10	9.3	88.1	70	130	0	0		
Mercury	0.2561	0.0500	0.2	0.1313	62.4	70	130	0	0		S
Nickel	13.95	0.100	10	4.185	97.6	70	130	0	0		
Selenium	8.799	0.100	10	0.2605	85.4	70	130	0	0		
Silver	8.494	0.0500	10	0.06374	84.3	70	130	0	0		
Thallium	9.293	0.100	10	0.06405	92.3	70	130	0	0		
Zinc	53.8	0.100	10	45.05	87.5	70	130	0	0		

Sample ID: **1012089-001A-MSD** SampType: **MSD** TestCode: **6020_S** Units: **mg/Kg** Prep Date: Run ID: **ICP-MS #1_101215C**
Client ID: **BT 1 (Bow)** Batch ID: **R28210** TestNo: **SW6020** Analysis **12/15/2010** SeqNo: **344871**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	1.752	0.100	10	1.035	7.17	70	130	1.553	12.1	25	S
Arsenic	10.41	0.100	10	1.436	89.7	70	130	10.67	2.46	25	
Beryllium	9.386	0.100	10	0.2787	91.1	70	130	9.872	5.05	25	
Cadmium	9.092	0.100	10	0.08918	90	70	130	8.98	1.24	25	
Chromium	14.75	0.100	10	4.644	101	70	130	15.38	4.17	25	
Copper	16.99	0.100	10	8.196	88	70	130	17.58	3.39	25	
Lead	17.99	0.100	10	9.3	86.9	70	130	18.11	0.693	25	

Qualifiers: ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method

CLIENT: HVJ Associates
Work Order: 1012089
Project: PO# 10-345 Project: HG1015021

ANALYTICAL QC SUMMARY REPORT

TestCode: 6020_S

16

Sample ID: **1012089-001A-MSD** SampType: **MSD** TestCode: **6020_S** Units: **mg/Kg** Prep Date: Run ID: **ICP-MS #1_101215C**
Client ID: **BT 1 (Bow)** Batch ID: **R28210** TestNo: **SW6020** Analysis **12/15/2010** SeqNo: **344871**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.2466	0.0500	0.2	0.1313	57.7	70	130	0.2561	3.81	25	S
Nickel	13.81	0.100	10	4.185	96.3	70	130	13.95	0.989	25	
Selenium	7.654	0.100	10	0.2605	73.9	70	130	8.799	13.9	25	
Silver	8.418	0.0500	10	0.06374	83.5	70	130	8.494	0.896	25	
Thallium	9.232	0.100	10	0.06405	91.7	70	130	9.293	0.664	25	
Zinc	52.13	0.100	10	45.05	70.8	70	130	53.8	3.16	25	

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method

Anacon, Inc.
730 FM 1959
Houston, TX 77034

QA/QC REPORT - LCS

Sample ID:	**LCS**	**Matrix:**	**Solid**
Anacon Number:	**1012089**	**Units**	**mg/kg**

Analyte / Method Number	Blk. Value	Spike Conc.	LCS Conc.	% Recovery	Recovery Limits
Ammonia(N)-350.3	0.1	20.0	16.8	84	80-120

LCS Advisory Limits

RPD: 0 out of 1 outside of QC limits

*Matrix interference
**Sample too concentrated to spike

QA/QC Manager MKight

Anacon, Inc.
730 FM 1959
Houston, TX 77034

QA/QC REPORT - MS/MSD

Sample ID: 1012089-001 **Matrix:** Solid
Anacon Number: 1012089 **Units** mg/kg

Analyte/Method Number	Blank	Sample	Spike Level	MS	% REC	MSD	% REC	RPD	QC LIMITS RPD	QC LIMITS % REC
Ammonia(N)-350.2	< 0.10	69.00	200.00	257.82	94.4	259.36	95.2	0.60	10	80-120

MS/MSD Advisory Limits

RPD: 0 out of 1 outside of QC limits
REC: 0 out of 2 oustide of QC limits

* Matrix Interference
** Sample too concentrated to spike

QA/QC Manager _____

Anacon, Inc.
730 FM 1959
Houston, TX 77034

QA/QC REPORT - LCS

Sample ID: LCS **Matrix:** Solid
Anacon Samples: 1012092, 089 **Units** mg/kg

Analyte / Method Number	Blk. Value	Spike Conc.	LCS Conc.	% Recovery	Recovery Limits
Cyanide	<0.05	2.000	1.675	84	80-120

LCS Advisory Limits

RPD: 0 out of 1 outside of QC limits

*Matrix interference
**Sample too concentrated to spike

QA/QC Manager MKight

Anacon, Inc.
730 FM 1959
Houston, TX 77034

0

QA/QC REPORT - MS/MSD

Sample ID: 1012090-001 MS/MSD **Matrix: Solid**
Anacon Samples: 1012092, 089 **Units mg/kg**

Analyte/Method Number	Blank	Sample	Spike Level	MS	% REC	MSD	% REC	RPD	QC LIMITS RPD	QC LIMITS % REC
Cyanide	< 0.05	< 0.050	1.800	1.794	97	1.697	92	5.56	20	80-120

MS/MSD Advisory Limits

RPD: 0 out of 1 outside of QC limits
REC: 0 out of 2 oustide of QC limits

* Matrix Interference
** Sample too concentrated to spike

QA/QC Manager _____

Anacon, Inc.
730 FM 1959
Houston, TX 77034

PESTICIDES QA/QC REPORT - LCS

Sample ID	lcs	4			Date of Analysis		12/13/2010
Job No.	2089				Matrix		soil
Method	3510C/8081A				Units		ug/kg

Analyte	Spike Level	LCS val	% REC	RECOVERY LIMITS
Lindane (gamma-BHC)	0.100	0.105	105.0	32-127
Heptachlor	0.100	0.067	67.0	34-111
Aldrin	0.100	0.113	113.0	42-122
Dieldrin	0.100	0.097	97.0	36-146
Endrin	0.100	0.093	93.0	30-147
4,4'-DDT	0.100	0.118	118.0	25-160
Surrogates				
Tetrachloro-m-xylene	0.100	0.068	68.0	30-150
Decachlorobiphenyl	0.100	0.043	43.0	30-150

* Matrix Interference
** Sample too concentrated to spike

LCS Advisory Limits
REC : 0 out of 6 oustide of QC limits

Surrogate Advisory Limits
REC: 0 out of 2 outside of QC limits

QA/QC Manager mlight

Anacon, Inc.
730 FM 1959
Houston, TX 77034

PESTICIDES QA/QC REPORT

Sample ID	blank		4				Date of Analysis			12/13/2010
Job No.	2089						Matrix			soil
Method	3510C/8081A						Units			ug/kg
Analyte	**Blank**	**Sample**	**Spike Level**	**MS**	**% REC**	**MSD**	**% REC**	**RPD**	**QC LIMITS RPD**	**QC LIMITS % REC**
Lindane (gamma-BH	<0.001	<0.001	0.100	0.109	109.0	0.122	122.0	11.3	50	32-127
Heptachlor	<0.001	<0.001	0.100	0.082	82.0	0.093	93.0	12.6	50	34-111
Aldrin	<0.001	<0.001	0.100	0.118	118.0	0.125	125.0	5.8	50	42-122
Dieldrin	<0.001	<0.001	0.100	0.109	109.0	0.119	119.0	8.8	50	36-146
Endrin	<0.001	<0.001	0.100	0.107	107.0	0.116	116.0	8.1	50	30-147
4,4'-DDT	<0.001	<0.001	0.100	0.132	132.0	0.143	143.0	8.0	50	25-160
Surrogates										
Tetrachloro-m-xylene			0.100	0.074	74.0	0.074	74.0	0.0	50	30-150
Decachlorobiphenyl			0.100	0.046	46.0	0.054	54.0	16.0	50	30-150

* Matrix Interference
** Sample too concentrated to spike

QA/QC Manager mkig

MS/MSD Advisory Limits

RPD :	0	out of 6 outside of QC limits
REC :	1	out of 12 oustide of QC limits

Surrogate Advisory Limits

RPD :	0	out of 2 outside of QC limits
REC:	0	out of 4 outside of QC limits

APPENDIX F

SLUG TEST RESULTS

F.1 Introduction and General Geologic Conditions

This section reports the results of the HVJ Associates aquifer slug test at the referenced site and subsequent analysis. The slug tests were performed on December 2, 2010 at two on-site monitoring wells PZ-1 and PZ-2 (see Plate 2 for well locations).

The surface soil conditions consist of dark gray fat clay and sand extending to well total depth. Groundwater was initially observed at depths ranging from 8 to 12 feet below ground surface (bgs). Water levels eventually stabilized at 7.84 to 11.75 feet bgs. Groundwater level measurements prior to slug testing indicate unconfined aquifer conditions exist at the site.

Geology and Soil Characteristics. A review of the Bureau of Economic Geology 1992 Geologic Atlas of Texas, Houston Sheet indicates that the uppermost geologic formation underlying the project area is the Pleistocene Beaumont Formation. The Beaumont Formation's sediments consist primarily of clays, silts and sands that were deposited in fluvial (river derived) and deltaic environments during the Pleistocene Epoch.

A review of the 1976 Soil Survey of Harris County, Texas indicates the majority of the soils in the project area are classified as Ijam soils, (map symbol Is). According to the survey, "Is" is a term applied to soil complexes that have boundaries that generally coincide with earthen dikes that were constructed to impound clayey sediment dredged or pumped from the floor of waterways. In general, these soils consist of a thin gray clay layer overlying gray clay with mottles and shell fragments. These soils are very poorly drained.

Groundwater Characteristics. Groundwater occurs in two main aquifers in the Houston area. The Chicot Aquifer is the shallowest aquifer that produces sufficient quantities of water for domestic, commercial and light industrial purposes. In this area, the Chicot is estimated to extend to approximately 500 feet below the ground surface. Below the Chicot is the Evangeline Aquifer. The Evangeline is the main source of groundwater in the Houston area. Its depth in the area ranges from 400 to 1200 feet below ground surface. Both aquifers dip gently toward the coast.

Shallower groundwater is also encountered in this area of Houston. Generally, this groundwater is of lesser quality than that found in the Chicot or Evangeline Aquifers. Typically, the shallow water-bearing zones are first encountered at a depth of 10 to 20 feet below ground surface. Groundwater movement direction is variable from location to location and may not follow the surface flow direction. The rate of groundwater movement in these shallow water-bearing zones is extremely slow and the production rates rarely exceed two gallons per minute.

Geologic Faulting. A review of surface faults was made from geologic literature and available in-house records. Based on our review, the project area is not located near any documented geologic fault. The closest geologic faults are the Wooster Faults that end east of the project area on the east side of Burnet Bay and the east west trending down to the southeast Battleground Fault located south of the project area. The down to the northwest Deepwater Fault parallels the Houston Ship Channel west of the project area and may have impacted the orientation of the ship channel in the general project area. We believe that faulting may not affect the project; however, it should be noted that unmapped faults that could impact the project may exist within the project area. A detailed fault assessment is not within the scope of this study.

F.2 Aquifer Slug Testing Procedures

Rising and falling head slug tests were performed on December 2, 2010 in monitoring wells PZ-1 and PZ-2. These wells were installed and developed immediately prior to the slug tests.

The slug used during the test consisted of a three-inch diameter, 5.1 foot long solid PVC pipe of sufficient weight to achieve negative buoyancy. An eye-bolt was attached to one end and the slug was raised and lowered with a rope. An In-Situ, Inc. (In-Situ) MiniTROLL Datalogger, In-Situ pressure transducer and In-Situ "Rugged Reader" handheld PC were used to record the groundwater levels.

Immediately prior to placing the slug in the monitoring well and commencing the tests, static water levels and total depths were measured and recorded in each test well with an electronic interface probe. Subsequent to these measurements, the pressure transducer was lowered into the well to within a few inches of the bottom of the well and secured at the ground surface to the well casing to prevent movement of the transducer. The datalogger was zeroed to read changes in the water surface from the static water level.

At the beginning of the test, the data logger was activated and the slug lowered in to the well simultaneously. The data logger recorded changes in the water surface at logarithmic time intervals. As the falling water level in the well approaches the static water level, changes in the water level approach zero. The "falling head" test was concluded when drawdown was close to the static water level measured previously. The static water level was measured with the electronic interface probe as a check and to confirm the return to static water level. At this point the data logger was shut down and prepared for further testing.

At the beginning of the next phase of testing, the data logger was activated and the slug removed from the well simultaneously. This "rising head" test was concluded when drawdown reached static water level. All slug test field data are provided in Appendix C.

F.3 Aquifer Slug Testing Analytical Procedures

The procedures described by Bouwer and Rice (1976, Water Resources Research, v. 12, pp. 423-428) as modified by Bouwer (1989, Ground Water, v. 27, No. 3, pp. 304-309) were used to determine the hydraulic conductivity (K) of the formation. For the purposes of the slug test analyses, it was assumed based on site data, that unconfined conditions exist (i.e. the thickness of the water bearing zone is equal to or greater than the thickness of the water column height in the saturated horizon). _

The unconfined aquifer Bouwer and Rice method requires that time and drawdown data be plotted on a semi-logarithmic plot and the following equations solved which incorporate well hydraulics and well geometry. The equations are:

$$K = \frac{r^2 \ln(R_C / r_W)}{2L_C}(1/t)\ln(y_0 / y_t)$$

$$\ln\frac{R_C}{r_W} = [\frac{1.1}{\ln(L_W / r_W)} + \frac{C}{L_c / r_w}]^{-1}$$

Where K = hydraulic conductivity; r_c = corrected radius of the casing; R_c = effective radial distance over which y is dissipated; y = the vertical distance between the water level inside the well and the static water table outside the well; r_w = radius of the borehole; L_c = length of the screened interval; L_w = height of the water in the well; C = a dimensionless parameter; and t = time.

The estimated hydraulic conductivity was determined by a multi-step process. In the first step, the recovery data collected by the transducer was modified to allow input into a proprietary data analytical program AQTESOLV. The time and displacement data were plotted on linear-log semi-logarithmic axes and a straight line predicted by the Bouwer-Rice solution was superimposed on the plot.

F.4 Aquifer Slug Testing Results

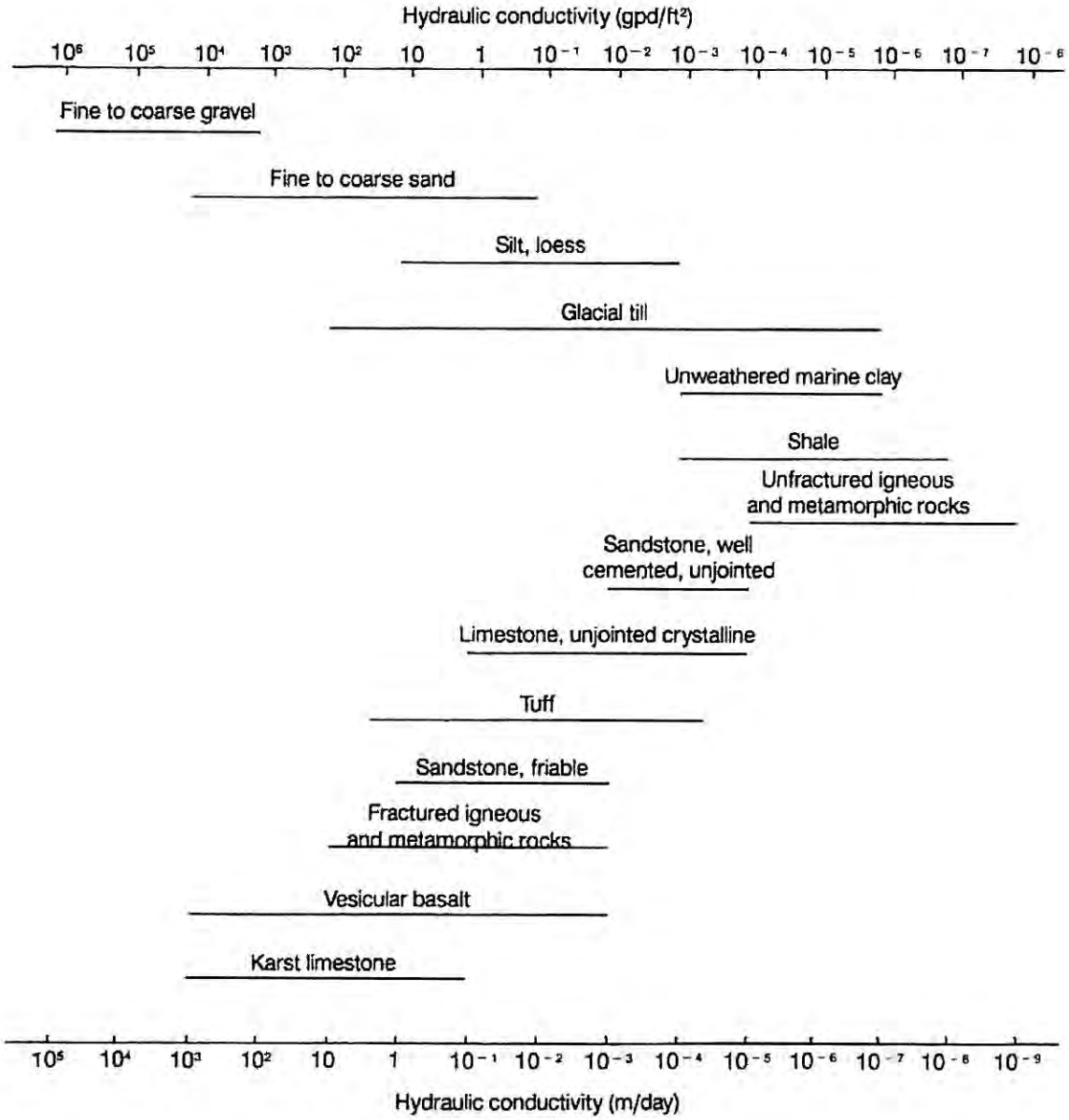
Based on analysis of aquifer slug testing data, the hydraulic conductivity for the water-bearing zone ranges from 1.041×10^{-1} to 3.555×10^{-1} gallons/day/ft^2 (gpd/ ft^2). These results indicate that the water-bearing zone is slightly conductive. Typical K values of consolidated and unconsolidated aquifers (after Davis, 1969; Dunn and Leopold, 1978 and Freeze and Cherry, 1979) showing the K range for various aquifer materials is provided.

It should be noted that monitoring wells by design are not optimally developed. Because of this, the calculated hydraulic conductivity may reflect the results of "entrance losses" and be up to half the true conductivity of the formation. The slug tests yield an estimate of the hydraulic conductivity around the borehole and conductivities derived from slug testing should not be construed as common throughout the water-bearing formation.

CALCULATED AQUIFER PARAMETERS
AQUIFER SLUG TEST REPORT
BATTLESHIP TEXAS

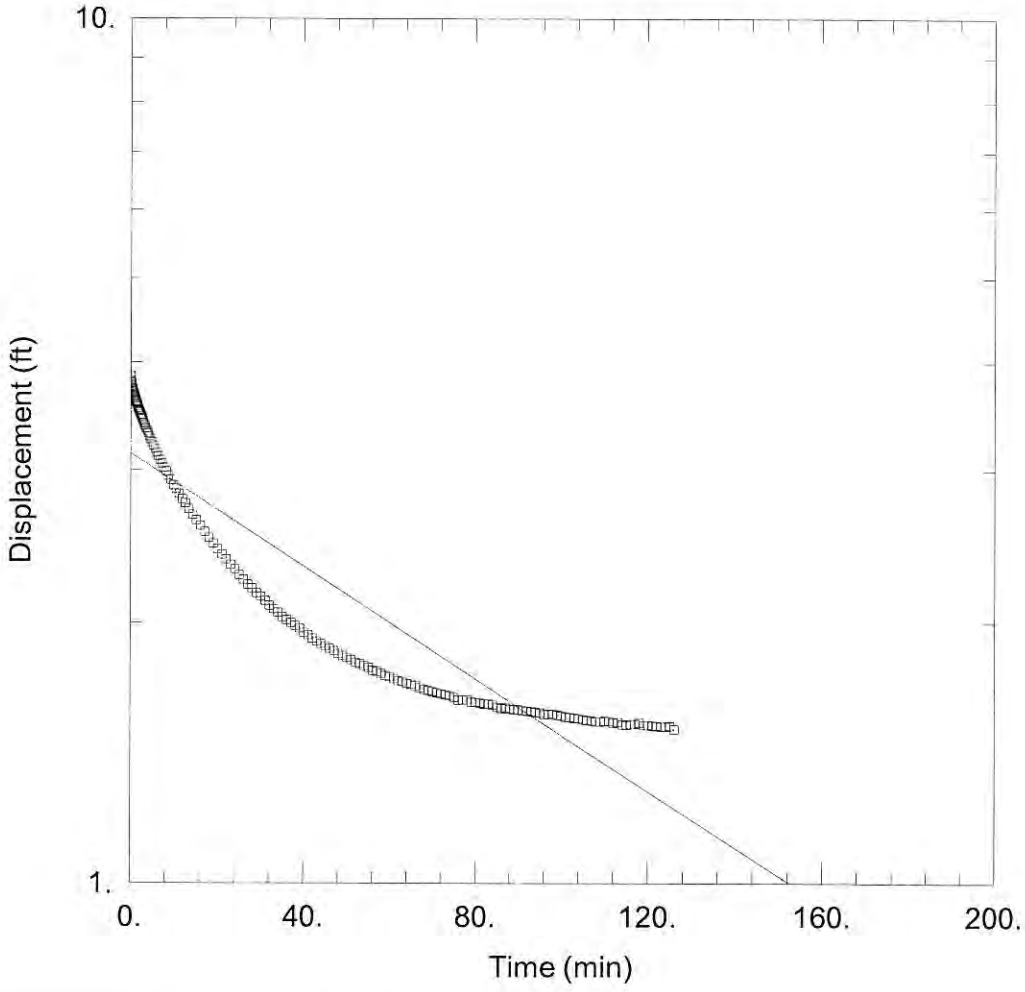
Monitoring Well	Test Type	Total Depth (ft.)	Initial Depth to Water (ft.)	Hydraulic Conductivity – K (gpd/ft^2)
PZ-1	rising head	42.17	7.32	3.555×10^{-1}
	falling head			2.574×10^{-1}
PZ-2	rising head	42.67	7.87	1.041×10^{-1}

Notes: The initial depth to water was measured from the top of casing to the water surface using an electronic interface probe.



Note: Table after Davis 1969; Dunn and Leopold, 1978 and Freeze and Cherry, 1979.

HVJ ASSOCIATES		Drawn:	EH	**Typical K Values for Consolidated and Unconsolidated Aquifers**	N
		Checked:	EH		
		Date:	December 2010		
Report No.	HG1015021	Scale:	NTS		



PZ-2 RISING HEAD SLUG TEST SECOND DATA SET

Data Set:
Date: 12/22/10 Time: 15:12:02

PROJECT INFORMATION

Company: HVJ Associates, Inc.
Client: AECOM
Project: HG1015021
Location: Battleship
Test Well: PZ-2
Test Date: 12/2/10

AQUIFER DATA

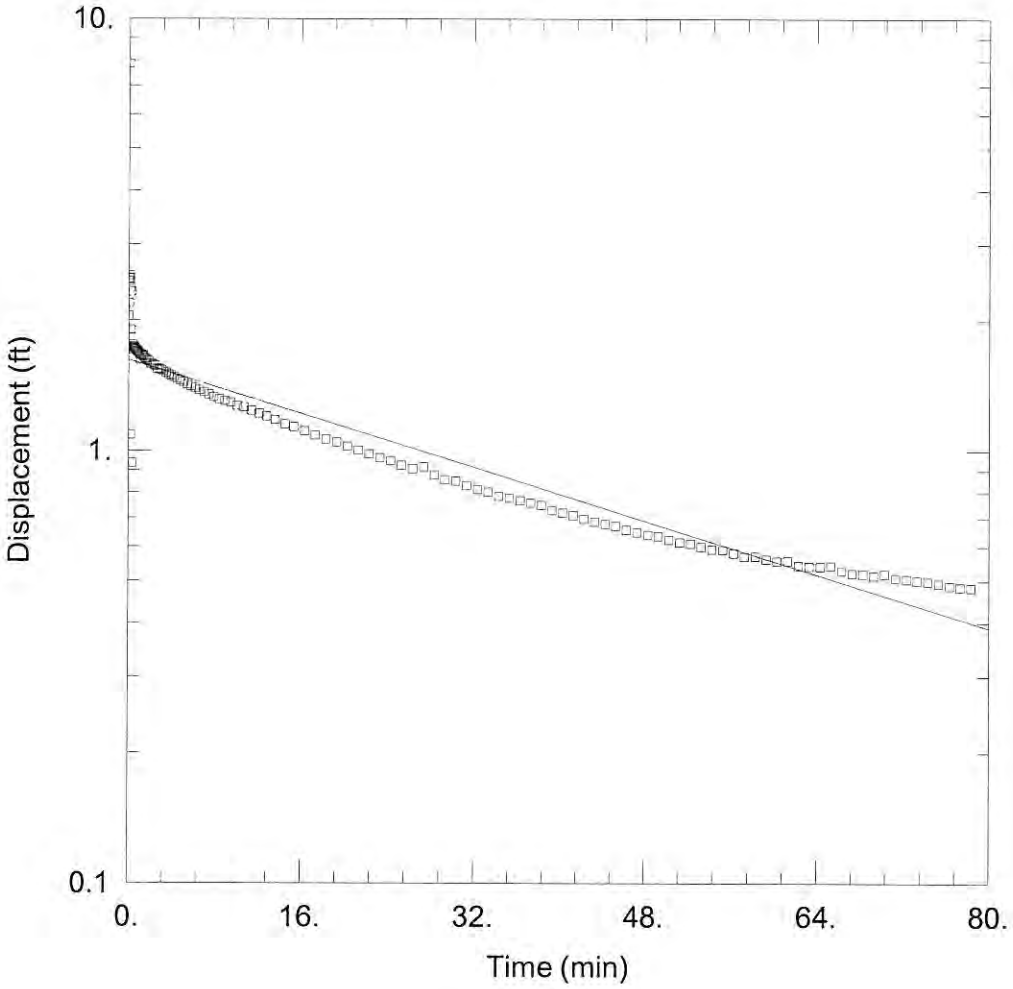
Saturated Thickness: 40. ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PZ-2)

Initial Displacement: 11.75 ft
Total Well Penetration Depth: 30.92 ft
Casing Radius: 0.167 ft
Static Water Column Height: 30.92 ft
Screen Length: 35. ft
Wellbore Radius: 0.333 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.1041 gal/day/ft^2
y0 = 3.139 ft



PZ-1 FALLING HEAD SECOND DATA SET

Data Set: G:\...\PZ-1 FALLING HEAD SECOND DATA SET.aqt
Date: 12/22/10 Time: 14:40:58

PROJECT INFORMATION

Company: HVJ Associates, Inc.
Client: AECOM
Project: HG1015021
Location: Battleship Texas
Test Well: PZ-1
Test Date: 12/2/10

AQUIFER DATA

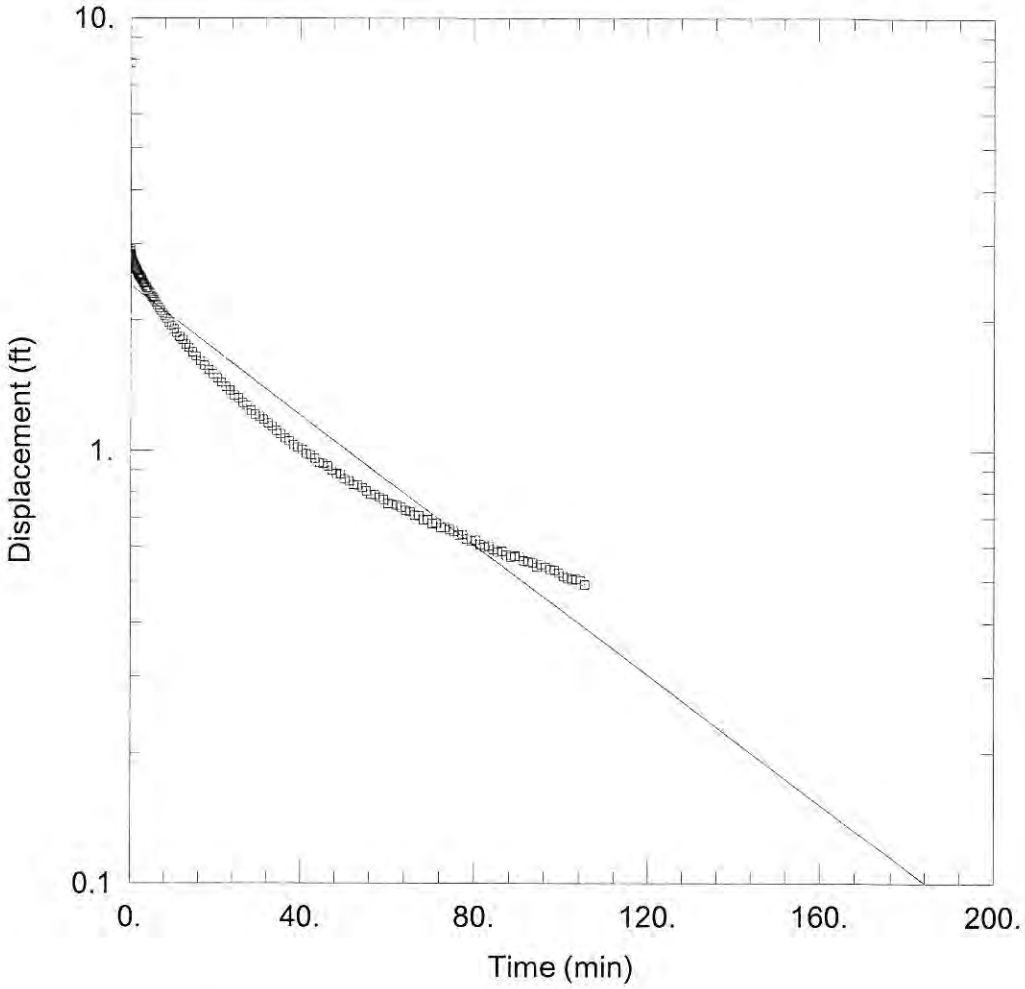
Saturated Thickness: 40. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (OW 1)

Initial Displacement: 7.87 ft
Total Well Penetration Depth: 35.3 ft
Casing Radius: 0.167 ft
Static Water Column Height: 35.3 ft
Screen Length: 35. ft
Wellbore Radius: 0.333 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.2574 gal/day/ft^2
y0 = 1.622 ft



PZ-1 RISING HEAD SLUG TEST SECOND DATA SET

Data Set: G:\...\PZ-1 RISING HEAD SECOND DATA SET.aqt
Date: 12/22/10 Time: 15:24:12

PROJECT INFORMATION

Company: HVJ Associates, Inc.
Client: AECOM
Project: HG1015201
Location: Battleship Texas
Test Well: PZ-1
Test Date: 12/2/10

AQUIFER DATA

Saturated Thickness: 40. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PZ-1)

Initial Displacement: 7.87 ft
Total Well Penetration Depth: 35.3 ft
Casing Radius: 0.167 ft
Static Water Column Height: 35.3 ft
Screen Length: 35. ft
Wellbore Radius: 0.333 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.2493 gal/day/ft^2
y0 = 2.411 ft

APPENDIX G

CONSOLIDATED UNDRAINED TRIAXIAL
COMPRESSION TEST RESULTS

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CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST
(WITH PORE PRESSURE MEASUREMENT)
ASTM D-4767

Project Name:	Battleship Texas
Project No.	HG1015021
Date Tested:	11/29/2010_12/10/2010
Technician:	KC

Boring No.	2
Sample No.	6
Sample Depth	13-15'
Date Calculated:	12/13/2010
Computed By :	KC

Sample Description	dark grey clay with silt	
Sample Data	**Initial**	**Final**
Sample Height (in)	5.502	4.398
Diameter (in)	2.765	3.022
Volume (in^3)	33.037	31.545
Weight (g)	959.8	933.6
Moisture Content (%)	36.9	38.4
Specific Gravity (assumed)	2.70	2.70
Void ratio	1.08	1.04
Saturation (%)	91.8	100.0
Wet Density (pcf)	110.6	114.5
Dry Density (pcf)	80.8	82.7
B Value	0.99	
Saturaion Method	Wet Mounting	

Moisture Content Data	**Initial**	**Final**
Wet + Tare (g)	116.60	122.23
Dry + Tare (g)	93.22	96.70
Tare Wt. (g)	29.83	30.26

	Experiment #	1	2	3
	Cell pressure (psi)	55	60	65
	Back pressure (psi)	50	50	50
	Confining Pressure (psi)	5	10	15
Initial Conditions	Initial Height during this experiment (in)	5.502	5.402	5.300
	Initial diameter during this experiment (in)	2.765	2.786	2.796
	Initial area (in^2)	6.005	6.095	6.142
	Initial Volume (in^3)	33.04	32.92	32.55
Consolidation	DV due to consolidation (cm^3)	1.9	6	1
	DV due to consolidation (in^3)	0.12	0.37	0.06
	Final Volume due to consolidation (in^3)	32.92	32.55	32.49
	Corrected area due to consolidation (in^2)	5.990	6.049	6.134
	Final Height due to consolidation (in)	5.496	5.382	5.297
	Time to 50 % consolidation (min)			
Shearing	Deformation during this experiment (in)	0.09	0.08	0.02
	Strain %	1.7	1.5	0.4
	Corrected Area due to shearing (in^2)	6.095	6.142	6.161
	Final Height due to shearing (in)	5.402	5.300	5.274
Stresses	Initial Pore Pressure reading during this exp. (psi)	48.77	49.97	47.73
	Final Pore pressure reading during this exp. (psi)	52.03	55.24	54.28
	Pore pressure (psi)	3.26	5.27	6.55
	Effective minor principal stress (psi)	1.74	4.73	8.45
	Deviator Force (Lbf)	55.12	79.98	111.01
	Deviator Stress (psi)	9.0	13.0	18.0
	Effective major principal stress (psi)	10.8	17.8	26.5

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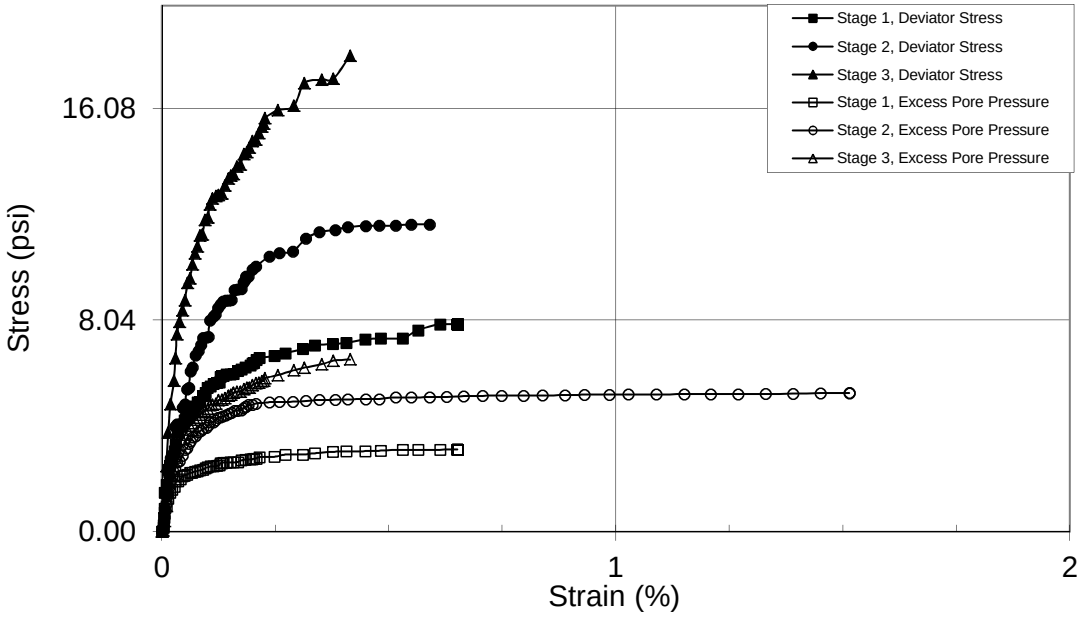
ASTM D-4767



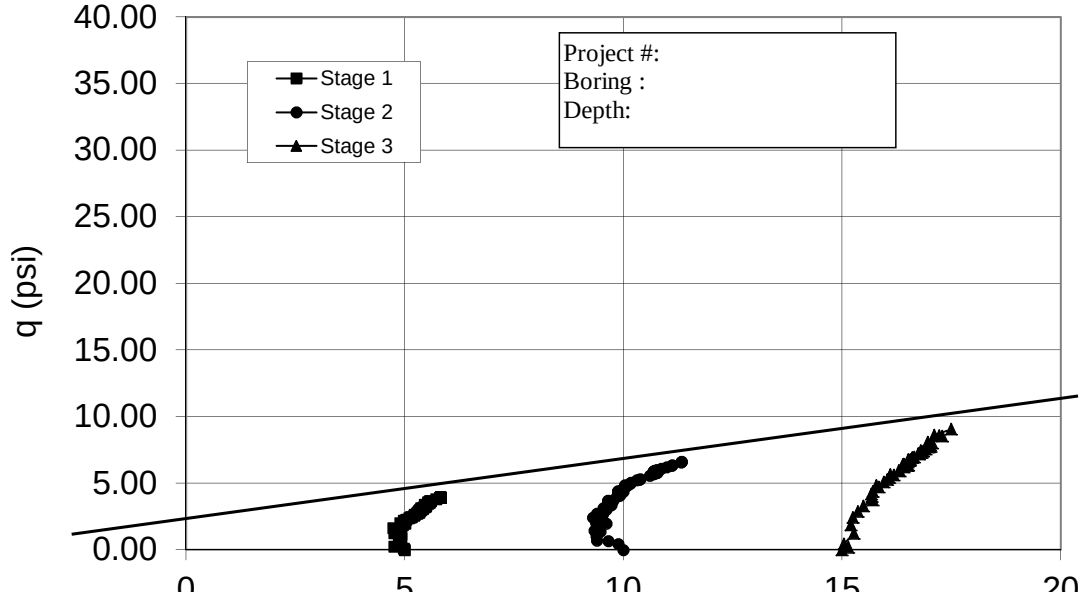


PLATE G-1b

Effective Stress Envelope

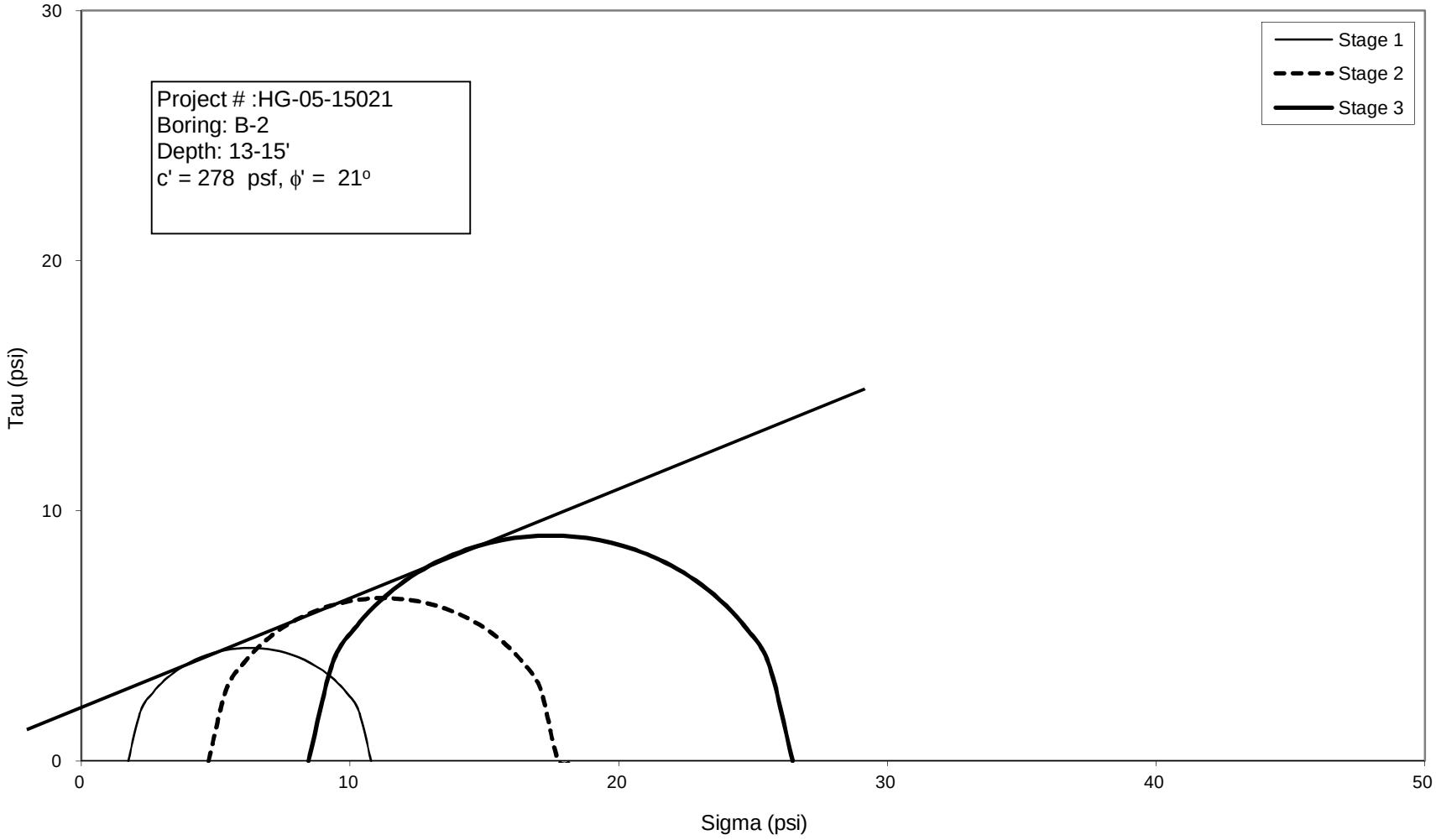


PLATE G-1c

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CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST
(WITH PORE PRESSURE MEASUREMENT)
ASTM D-4767

Project Name:	Battleship Texas
Project No.	HG1015021
Date Tested:	12/6/2010 - 12/23/2010
Technician:	KC

Boring No.	3
Sample No.	5
Sample Depth	8-10'
Date Calculated:	12/30/2010
Computed By :	KC

Sample Description	blue-grey, brownish yellow silty sandy clay	
Sample Data	**Initial**	**Final**
Sample Height (in)	5.437	4.376
Diameter (in)	2.776	3.032
Volume (in^3)	32.907	31.595
Weight (g)	1095.0	111.8
Moisture Content (%)	22.5	21.8
Specific Gravity (assumed)	2.70	2.70
Void ratio	0.63	0.59
Saturation (%)	96.5	100.0
Wet Density (pcf)	126.7	129.2
Dry Density (pcf)	103.5	106.0
B Value	0.96	
Saturaion Method	Wet Mounting	

Moisture Content Data	**Initial**	**Final**
Wet + Tare (g)	141.71	154.34
Dry + Tare (g)	121.23	132.05
Tare Wt. (g)	30.01	29.84

	Experiment #	1	2	3
	Cell pressure (psi)	55	60	65
	Back pressure (psi)	50	50	50
	Confining Pressure (psi)	5	10	15
Initial Conditions	Initial Height during this experiment (in)	5.437	5.305	5.218
	Initial diameter during this experiment (in)	2.776	2.794	2.794
	Initial area (in^2)	6.052	6.131	6.130
	Initial Volume (in^3)	32.91	32.52	31.98
Consolidation	DV due to consolidation (cm^3)	6.3	8.8	7.3
	DV due to consolidation (in^3)	0.38	0.54	0.45
	Final Volume due to consolidation (in^3)	32.52	31.99	31.54
	Corrected area due to consolidation (in^2)	6.005	6.063	6.072
	Final Height due to consolidation (in)	5.416	5.275	5.194
	Time to 50 % consolidation (min)			
Shearing	Deformation during this experiment (in)	0.11	0.06	0.02
	Strain %	2.1	1.1	0.3
	Corrected Area due to shearing (in^2)	6.131	6.130	6.093
	Final Height due to shearing (in)	5.305	5.218	5.176
Stresses	Initial Pore Pressure reading during this exp. (psi)	49.97	51.84	50.10
	Final Pore pressure reading during this exp. (psi)	52.03	55.41	56.58
	Pore pressure (psi)	2.06	3.57	6.48
	Effective minor principal stress (psi)	2.94	6.43	8.52
	Deviator Force (Lbf)	56.37	88.76	120.91
	Deviator Stress (psi)	9.2	14.5	19.8
	Effective major principal stress (psi)	12.1	20.9	28.4

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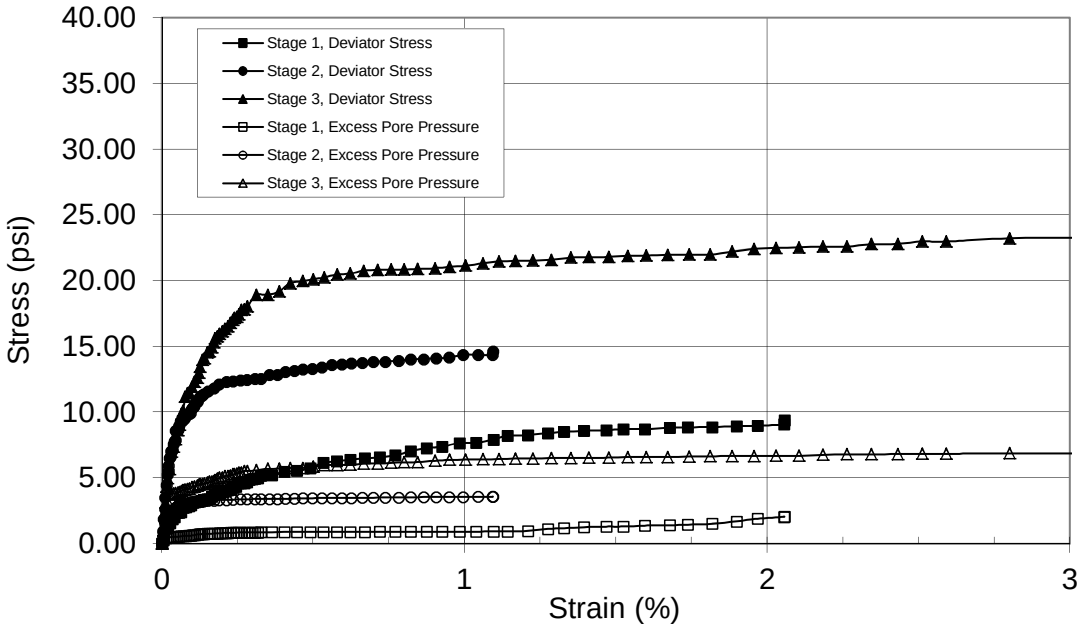

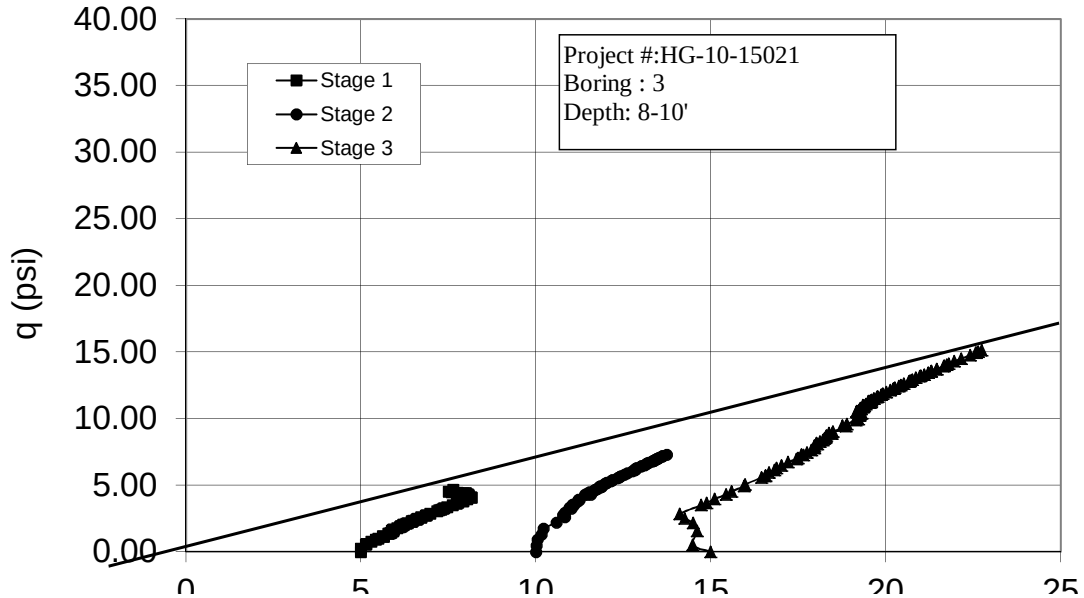

PLATE G-2b

Effective Stress Envelope

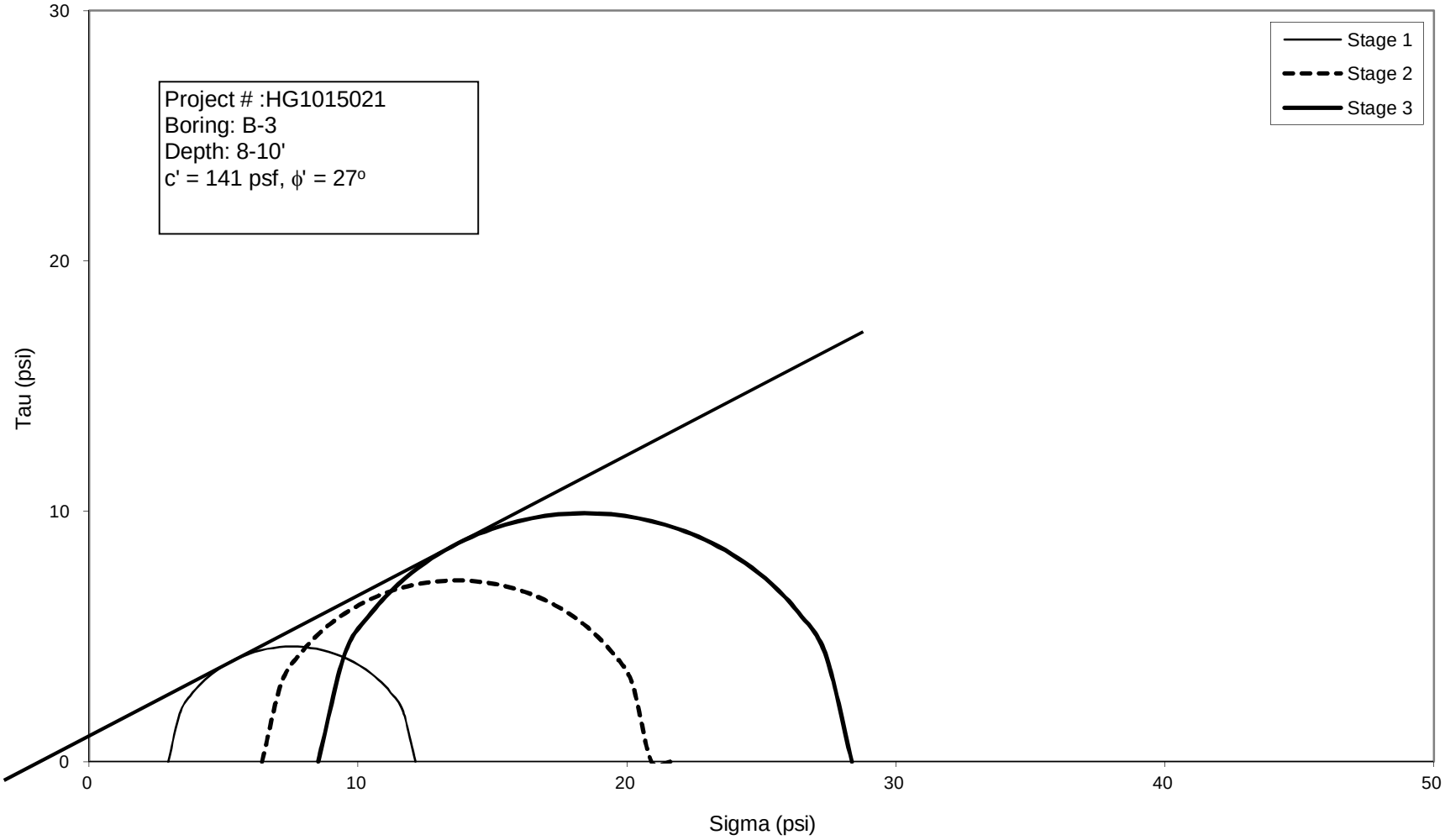

PLATE G-2c

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CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST
(WITH PORE PRESSURE MEASUREMENT)
ASTM D-4767

Project Name:	Battleship Texas
Project No.	HG1015021
Date Tested:	12/23/2010 - 1/6/2011
Technician:	KC

Boring No.	3
Sample No.	10
Sample Depth	33-35'
Date Calculated:	1/10/2011
Computed By :	KC

Sample Description	reddish brown, light grey clay	
Sample Data	**Initial**	**Final**
Sample Height (in)	5.512	4.866
Diameter (in)	2.787	3.042
Volume (in^3)	33.626	35.366
Weight (g)	1109.3	1130.4
Moisture Content (%)	27.9	29.0
Specific Gravity (assumed)	2.70	2.70
Void ratio	0.72	0.78
Saturation (%)	105.3	100.0
Wet Density (pcf)	125.6	121.9
Dry Density (pcf)	98.2	94.5
B Value	1.00	
Saturaion Method	Wet Mounting	

Moisture Content Data	**Initial**	**Final**
Wet + Tare (g)	126.60	130.21
Dry + Tare (g)	105.75	107.73
Tare Wt. (g)	31.01	30.20

	Experiment #	1	2	3
	Cell pressure (psi)	55	60	65
	Back pressure (psi)	50	50	50
	Confining Pressure (psi)	5	10	15
Initial Conditions	Initial Height during this experiment (in)	5.512	5.473	5.432
	Initial diameter during this experiment (in)	2.787	2.790	2.792
	Initial area (in^2)	6.100	6.114	6.123
	Initial Volume (in^3)	33.63	33.46	33.26
Consolidation	DV due to consolidation (cm^3)	2.7	3.3	3.3
	DV due to consolidation (in^3)	0.16	0.20	0.20
	Final Volume due to consolidation (in^3)	33.46	33.26	33.06
	Corrected area due to consolidation (in^2)	6.080	6.089	6.098
	Final Height due to consolidation (in)	5.503	5.462	5.421
	Time to 50 % consolidation (min)			
Shearing	Deformation during this experiment (in)	0.03	0.03	0.06
	Strain %	0.6	0.6	1.1
	Corrected Area due to shearing (in^2)	6.114	6.123	6.169
	Final Height due to shearing (in)	5.473	5.432	5.359
Stresses	Initial Pore Pressure reading during this exp. (psi)	50.96	49.69	50.99
	Final Pore pressure reading during this exp. (psi)	53.78	55.02	57.15
	Pore pressure (psi)	2.82	5.33	6.16
	Effective minor principal stress (psi)	2.18	4.67	8.84
	Deviator Force (Lbf)	37.61	59.61	77.94
	Deviator Stress (psi)	6.2	9.7	12.6
	Effective major principal stress (psi)	8.3	14.4	21.5

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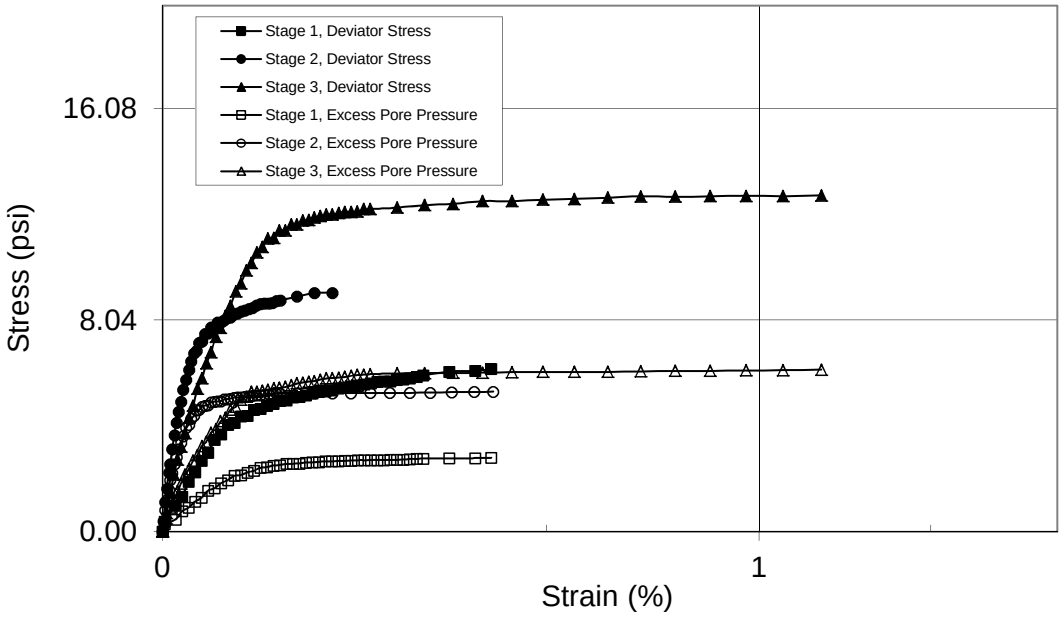
ASTM D-4767



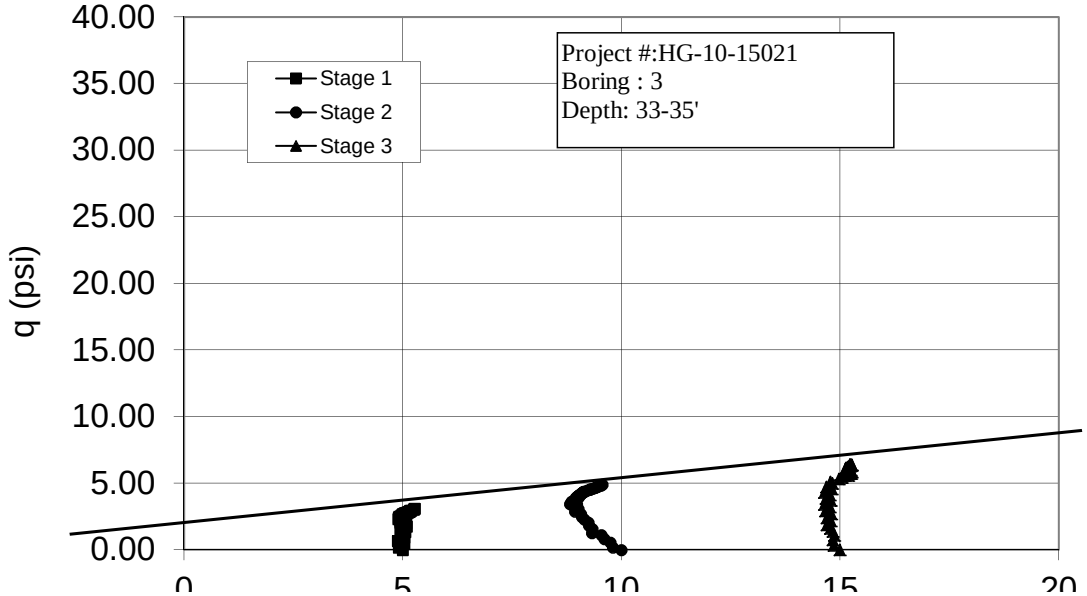


PLATE G-3b

Effective Stress Envelope

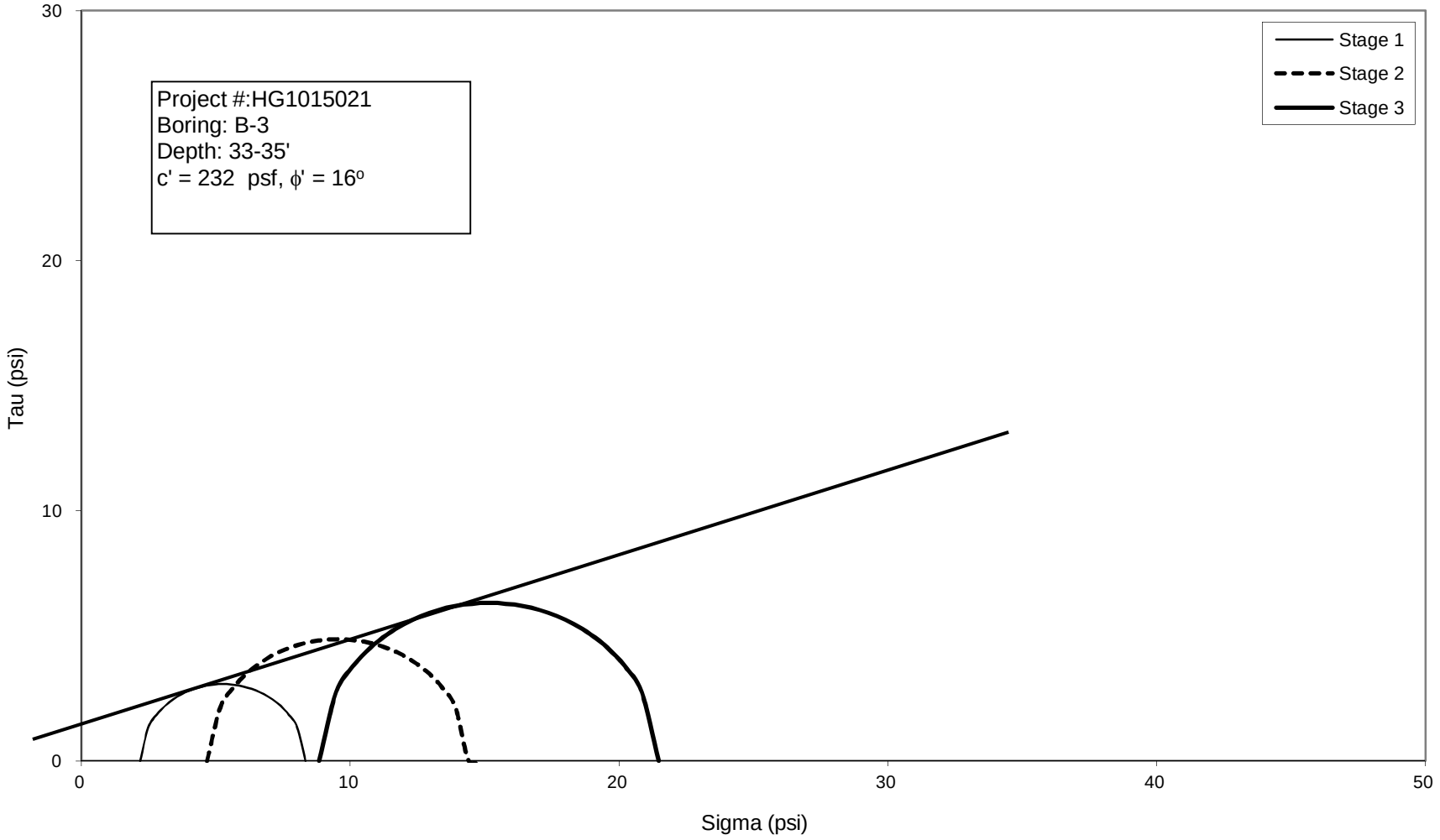


PLATE G-3c

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CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST
(WITH PORE PRESSURE MEASUREMENT)
ASTM D-4767

Project Name:	Battelship Texas
Project No.	HG1015021
Date Tested:	12/28/2010 - 1/7/2011
Technician:	KC

Boring No.	4
Sample No.	9
Sample Depth	28-30'
Date Calculated:	1/10/2011
Computed By :	KC

Sample Description	brownish yellow, light grey clay with sand seam	
Sample Data	**Initial**	**Final**
Sample Height (in)	5.486	4.737
Diameter (in)	2.812	3.075
Volume (in^3)	34.070	35.179
Weight (g)	1083.0	1094.4
Moisture Content (%)	34.0	32.8
Specific Gravity (assumed)	2.70	2.70
Void ratio	0.86	0.89
Saturation (%)	106.1	100.0
Wet Density (pcf)	121.1	118.7
Dry Density (pcf)	90.4	89.4
B Value	0.98	
Saturaion Method	Wet Mounting	

Moisture Content Data	**Initial**	**Final**
Wet + Tare (g)	118.48	132.49
Dry + Tare (g)	96.11	107.28
Tare Wt. (g)	30.22	30.42

	Experiment #	1	2	3
	Cell pressure (psi)	55	60	65
	Back pressure (psi)	50	50	50
	Confining Pressure (psi)	5	10	15
Initial Conditions	Initial Height during this experiment (in)	5.486	5.455	5.418
	Initial diameter during this experiment (in)	2.812	2.808	2.809
	Initial area (in^2)	6.210	6.192	6.199
	Initial Volume (in^3)	34.07	33.78	33.59
Consolidation	DV due to consolidation (cm^3)	4.8	3.1	4.5
	DV due to consolidation (in^3)	0.29	0.19	0.27
	Final Volume due to consolidation (in^3)	33.78	33.59	33.31
	Corrected area due to consolidation (in^2)	6.175	6.169	6.165
	Final Height due to consolidation (in)	5.470	5.444	5.403
	Time to 50 % consolidation (min)			
Shearing	Deformation during this experiment (in)	0.02	0.03	0.11
	Strain %	0.3	0.5	2.1
	Corrected Area due to shearing (in^2)	6.192	6.199	6.298
	Final Height due to shearing (in)	5.455	5.418	5.289
Stresses	Initial Pore Pressure reading during this exp. (psi)	49.64	49.55	48.98
	Final Pore pressure reading during this exp. (psi)	53.07	55.19	56.88
	Pore pressure (psi)	3.43	5.64	7.90
	Effective minor principal stress (psi)	1.57	4.36	7.10
	Deviator Force (Lbf)	52.72	72.69	97.36
	Deviator Stress (psi)	8.5	11.7	15.5
	Effective major principal stress (psi)	10.1	16.1	22.6

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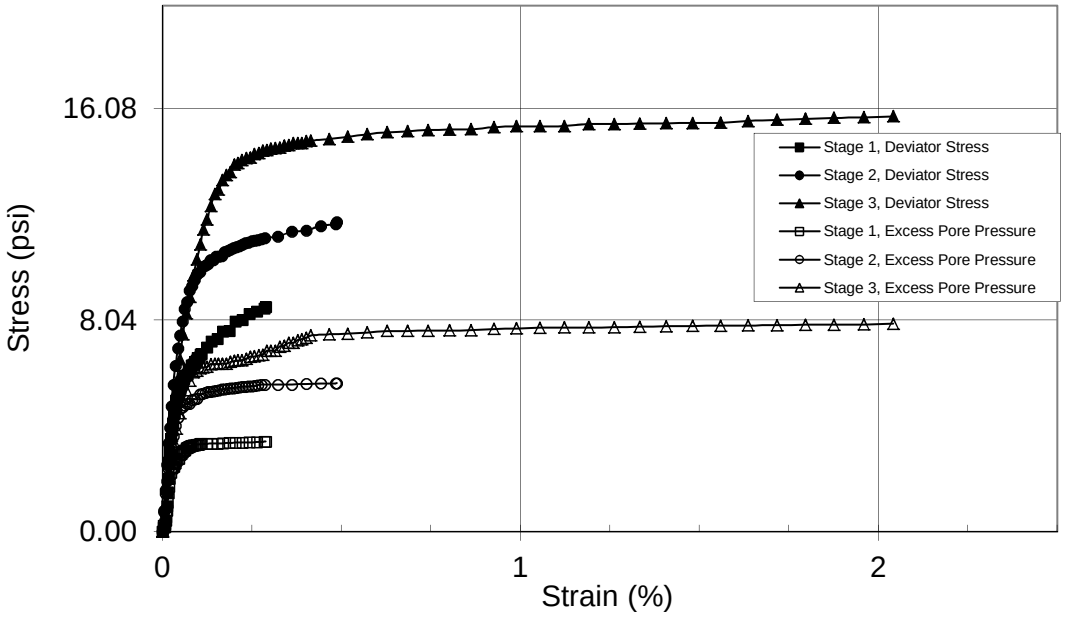
ASTM D-4767



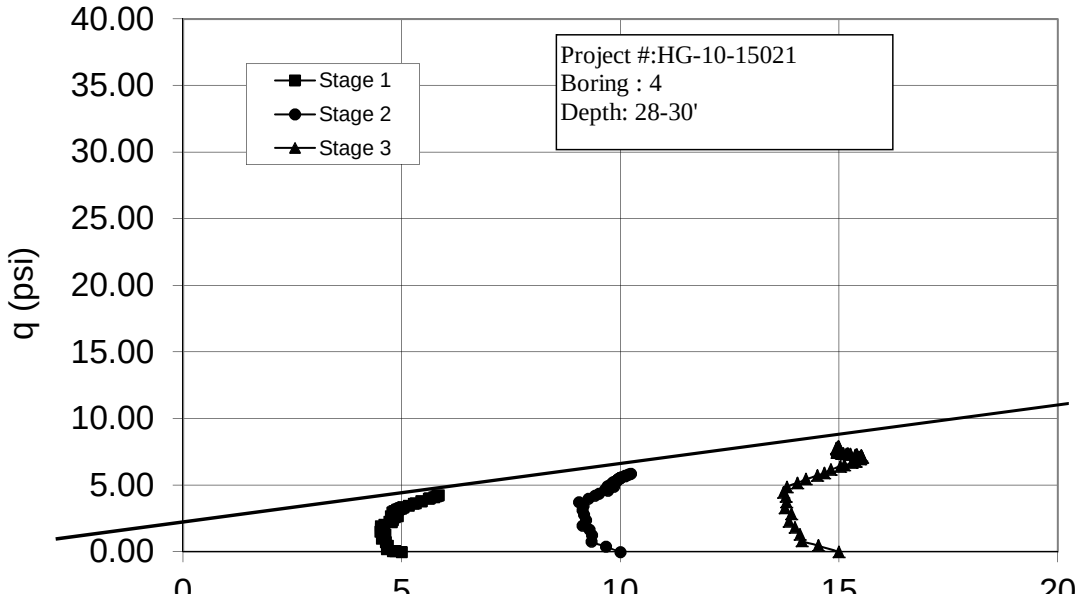


PLATE G-4b

Effective Stress Envelope

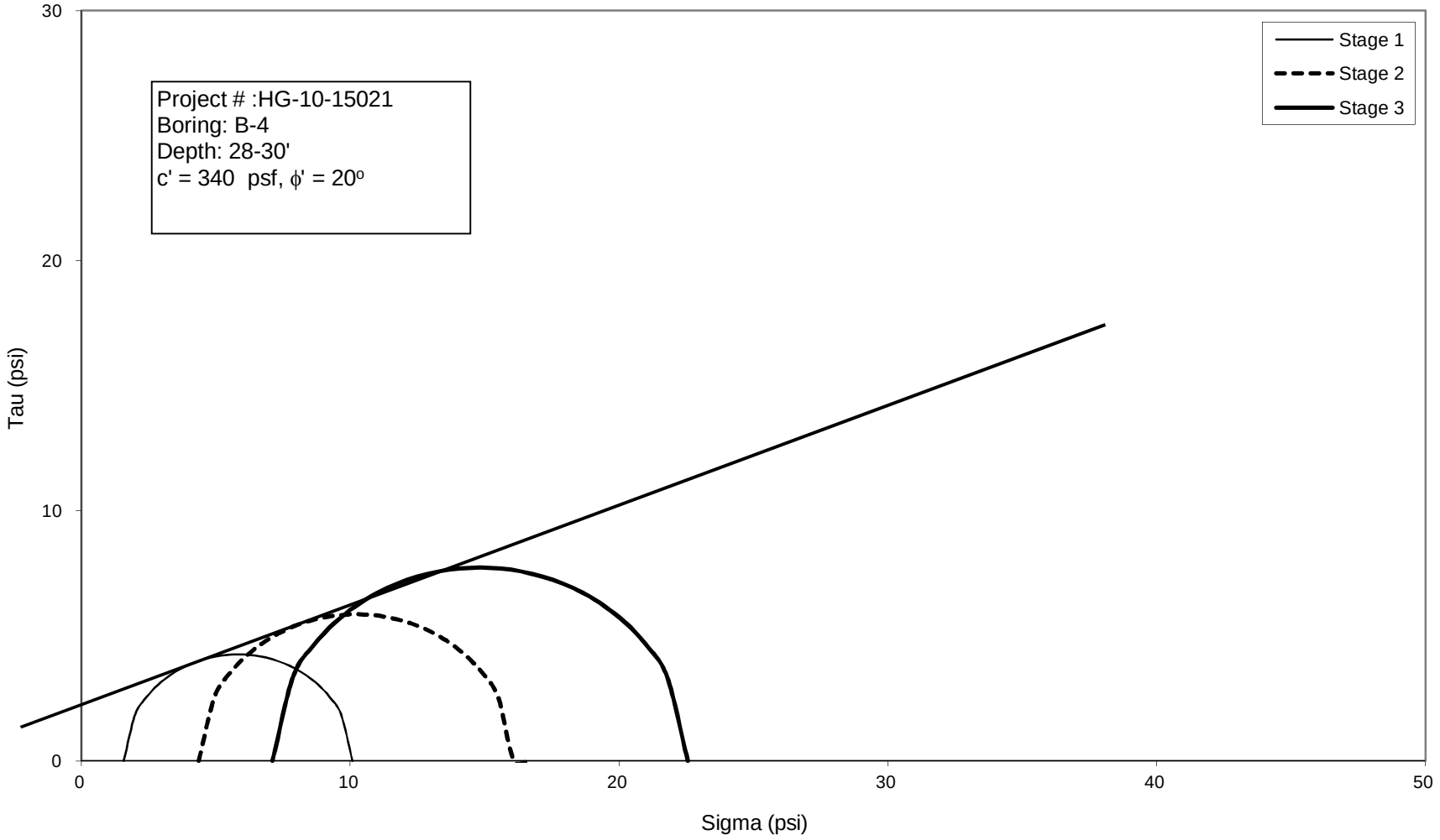


PLATE G-4c

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CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST
(WITH PORE PRESSURE MEASUREMENT)
ASTM D-4767

Project Name:	Battleship Texas
Project No.	HG1015021
Date Tested:	12/10/2010 - 12/28/2010
Technician:	KC

Boring No.	4
Sample No.	14
Sample Depth	58-60'
Date Calculated:	12/30/2010
Computed By :	KC

Sample Description	reddish brown, light grey clay	
Sample Data	**Initial**	**Final**
Sample Height (in)	5.600	4.595
Diameter (in)	2.836	3.274
Volume (in^3)	35.374	38.684
Weight (g)	1157.4	1183.6
Moisture Content (%)	24.6	29.0
Specific Gravity (assumed)	2.70	2.70
Void ratio	0.69	0.78
Saturation (%)	97.1	100.0
Wet Density (pcf)	124.6	121.9
Dry Density (pcf)	100.0	94.5
B Value	0.99	
Saturaion Method	Wet Mounting	

Moisture Content Data	**Initial**	**Final**
Wet + Tare (g)	126.14	134.29
Dry + Tare (g)	107.18	110.90
Tare Wt. (g)	30.26	30.29

	Experiment #	1	2	3
	Cell pressure (psi)	55	60	65
	Back pressure (psi)	50	50	50
	Confining Pressure (psi)	5	10	15
Initial Conditions	Initial Height during this experiment (in)	5.600	5.554	5.499
	Initial diameter during this experiment (in)	2.836	2.842	2.842
	Initial area (in^2)	6.317	6.343	6.343
	Initial Volume (in^3)	35.37	35.23	34.88
Consolidation	DV due to consolidation (cm^3)	2.4	5.7	4.7
	DV due to consolidation (in^3)	0.15	0.35	0.29
	Final Volume due to consolidation (in^3)	35.23	34.88	34.59
	Corrected area due to consolidation (in^2)	6.299	6.301	6.308
	Final Height due to consolidation (in)	5.592	5.536	5.484
	Time to 50 % consolidation (min)			
Shearing	Deformation during this experiment (in)	0.04	0.04	0.45
	Strain %	0.7	0.7	8.2
	Corrected Area due to shearing (in^2)	6.343	6.343	6.871
	Final Height due to shearing (in)	5.554	5.499	5.033
Stresses	Initial Pore Pressure reading during this exp. (psi)	48.86	47.95	44.52
	Final Pore pressure reading during this exp. (psi)	53.06	53.59	52.08
	Pore pressure (psi)	4.20	5.64	7.56
	Effective minor principal stress (psi)	0.80	4.36	7.44
	Deviator Force (Lbf)	66.48	90.14	147.7
	Deviator Stress (psi)	10.5	14.2	21.5
	Effective major principal stress (psi)	11.3	18.6	28.9

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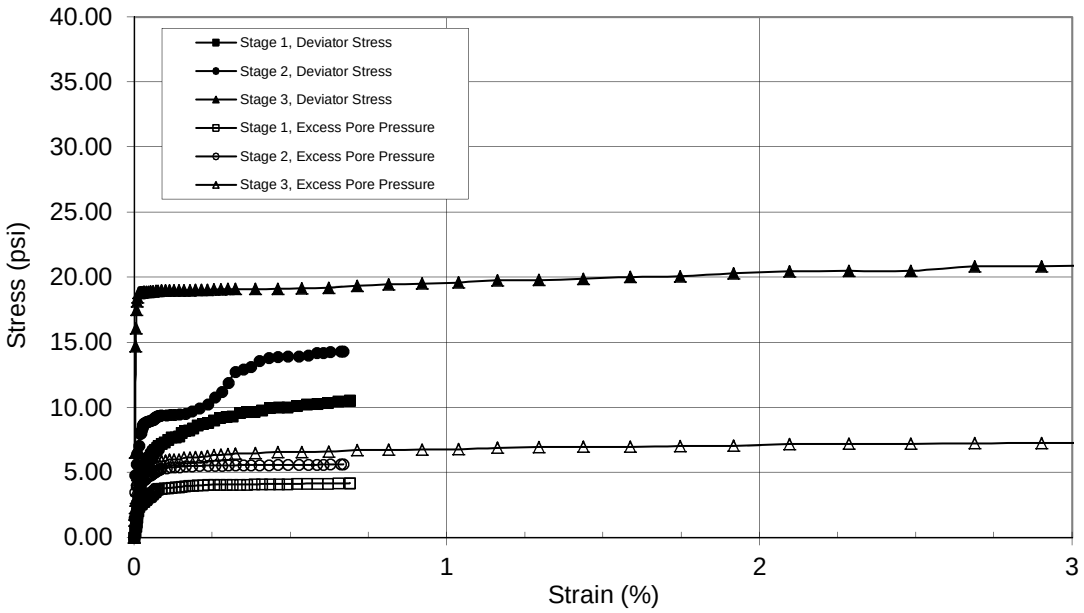
ASTM D-4767



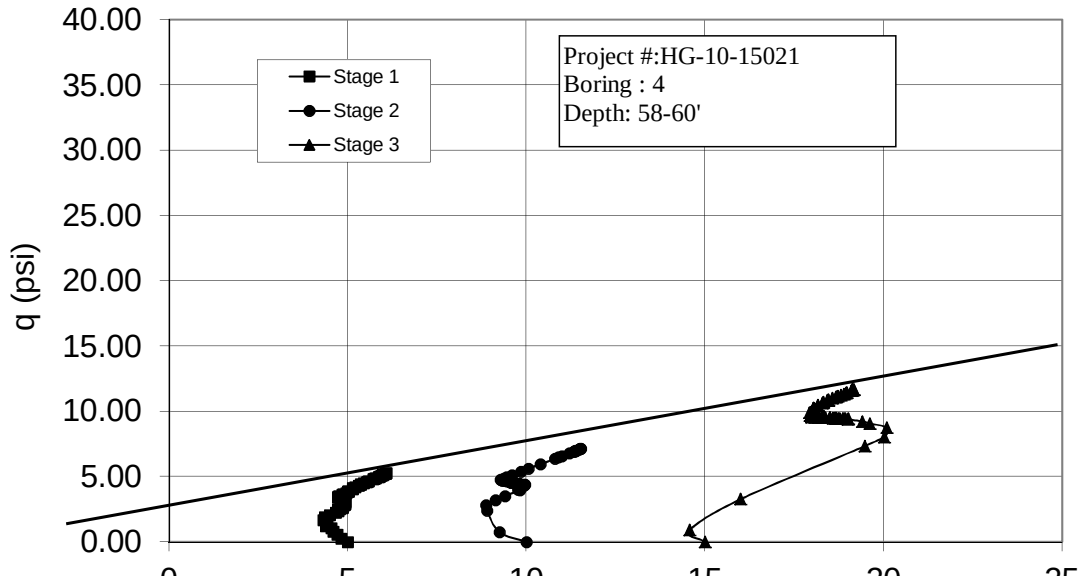


PLATE G-5b

Effective Stress Envelope

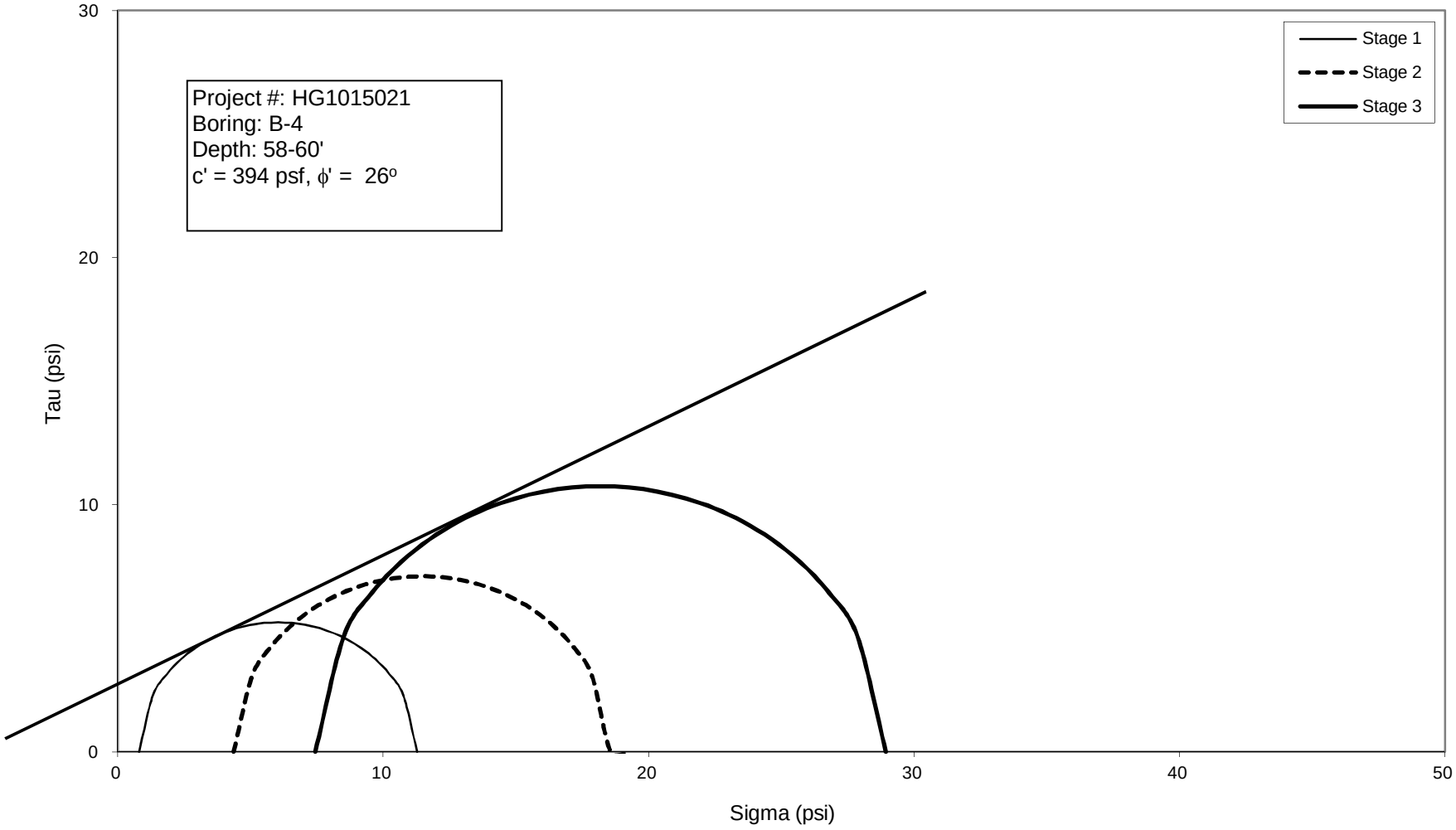


PLATE G-5c

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CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST
(WITH PORE PRESSURE MEASUREMENT)
ASTM D-4767

Project Name:	Battleship Texas	Boring No.	5
Project No.	HG1015021	Sample No.	5
Date Tested:	12/9/2010 - 12/12/24/2010	Sample Depth	8-10'
Technician:	KC	Date Calculated:	12/30/2010
		Computed By :	KC

Sample Description	light brownish yellow, light brown silty sandy clay	
Sample Data	**Initial**	**Final**
Sample Height (in)	5.527	4.414
Diameter (in)	2.768	2.965
Volume (in^3)	33.259	30.477
Weight (g)	1144.2	1110.9
Moisture Content (%)	20.5	17.0
Specific Gravity (assumed)	2.70	2.70
Void ratio	0.55	0.46
Saturation (%)	100.8	100.0
Wet Density (pcf)	131.0	135.2
Dry Density (pcf)	108.7	115.6
B Value	0.98	
Saturaion Method	Wet Mounting	

Moisture Content Data	**Initial**	**Final**
Wet + Tare (g)	163.59	149.11
Dry + Tare (g)	140.79	131.87
Tare Wt. (g)	29.78	30.22

	Experiment #	1	2	3
	Cell pressure (psi)	55	60	65
	Back pressure (psi)	50	50	50
	Confining Pressure (psi)	5	10	15
Initial Conditions	Initial Height during this experiment (in)	5.527	5.379	5.329
	Initial diameter during this experiment (in)	2.768	2.790	2.783
	Initial area (in^2)	6.018	6.115	6.082
	Initial Volume (in^3)	33.26	32.89	32.41
Consolidation	DV due to consolidation (cm^3)	6	7.9	5.4
	DV due to consolidation (in^3)	0.37	0.48	0.33
	Final Volume due to consolidation (in^3)	32.89	32.41	32.08
	Corrected area due to consolidation (in^2)	5.973	6.054	6.040
	Final Height due to consolidation (in)	5.507	5.353	5.311
	Time to 50 % consolidation (min)			
Shearing	Deformation during this experiment (in)	0.13	0.02	0.24
	Strain %	2.3	0.5	4.5
	Corrected Area due to shearing (in^2)	6.115	6.082	6.328
	Final Height due to shearing (in)	5.379	5.329	5.069
Stresses	Initial Pore Pressure reading during this exp. (psi)	51.06	49.39	50.09
	Final Pore pressure reading during this exp. (psi)	53.07	52.91	52.57
	Pore pressure (psi)	2.01	3.52	2.48
	Effective minor principal stress (psi)	2.99	6.48	12.52
	Deviator Force (Lbf)	89.29	155.25	205.5
	Deviator Stress (psi)	14.6	25.5	32.5
	Effective major principal stress (psi)	17.6	32.0	45.0

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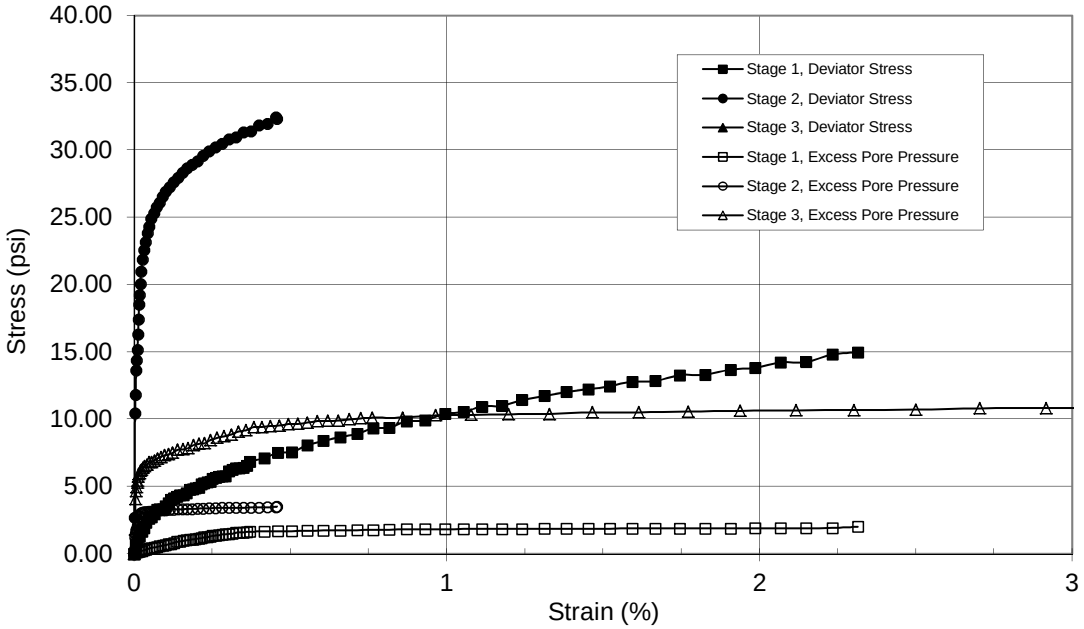

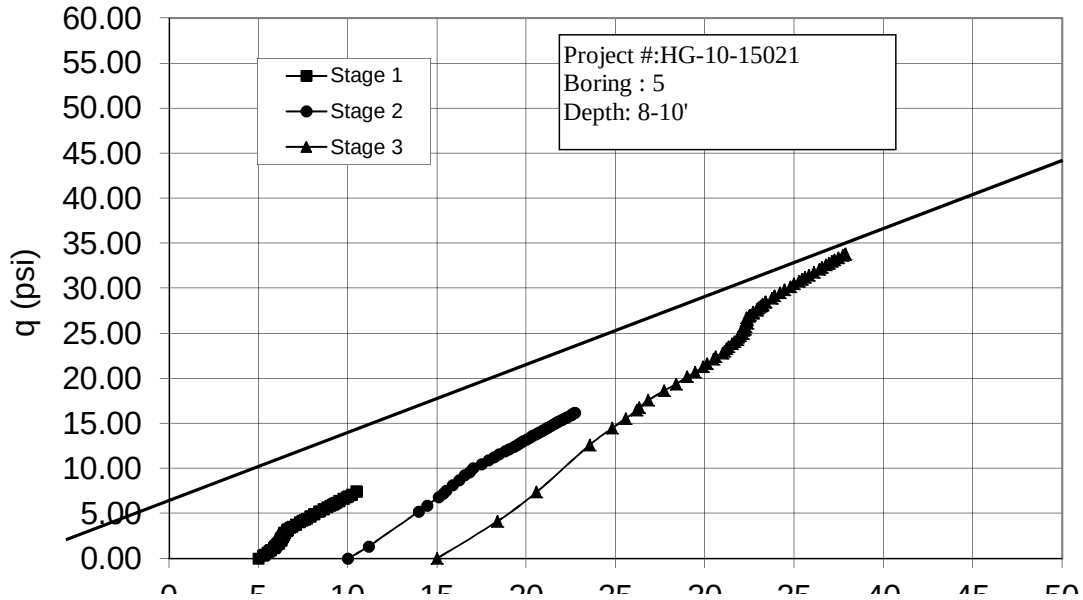

PLATE G-6b

Effective Stress Envelope

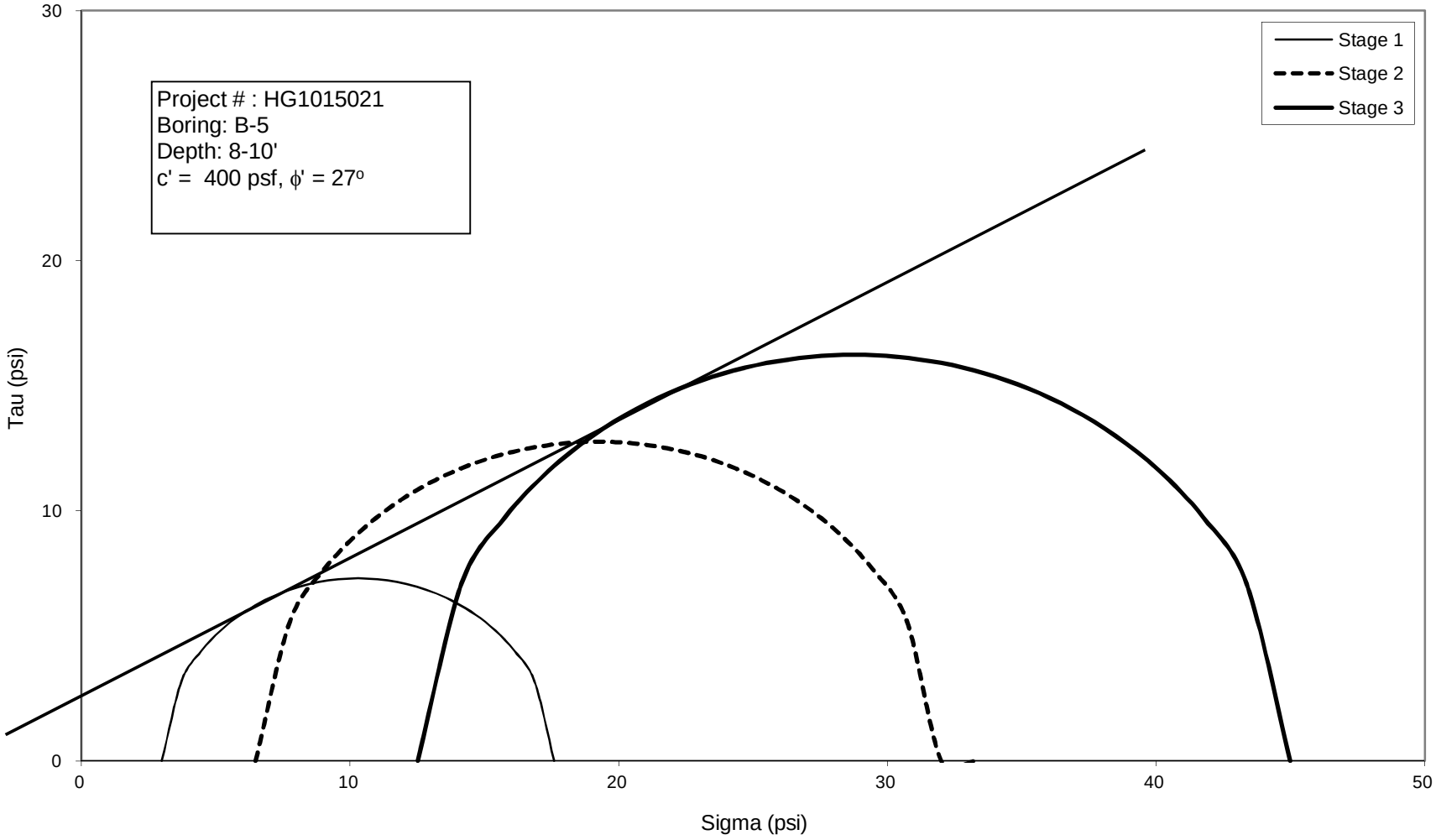

PLATE G-6c

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CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST
(WITH PORE PRESSURE MEASUREMENT)
ASTM D-4767

Project Name:	Battleship Texas
Project No.	HG1015021
Date Tested:	12/28/2010 - 1/11/2011
Technician:	KC

Boring No.	6
Sample No.	6
Sample Depth	13-15'
Date Calculated:	1/12/2011
Computed By :	KC

Sample Description	reddish brown clay with ferrous inclusions	
Sample Data	**Initial**	**Final**
Sample Height (in)	5.590	4.698
Diameter (in)	2.800	3.021
Volume (in^3)	34.421	33.675
Weight (g)	1128.4	1136.3
Moisture Content (%)	22.8	30.3
Specific Gravity (assumed)	2.70	2.70
Void ratio	0.66	0.82
Saturation (%)	93.6	100.0
Wet Density (pcf)	124.9	120.8
Dry Density (pcf)	101.7	92.7
B Value	0.97	
Saturaion Method	Wet Mounting	

Moisture Content Data	**Initial**	**Final**
Wet + Tare (g)	161.96	147.13
Dry + Tare (g)	137.36	119.99
Tare Wt. (g)	29.27	30.34

	Experiment #	1	2	3
	Cell pressure (psi)	55	60	65
	Back pressure (psi)	50	50	50
	Confining Pressure (psi)	5	10	15
Initial Conditions	Initial Height during this experiment (in)	5.590	5.539	5.474
	Initial diameter during this experiment (in)	2.800	2.810	2.822
	Initial area (in^2)	6.158	6.203	6.256
	Initial Volume (in^3)	34.42	34.36	34.25
Consolidation	DV due to consolidation (cm^3)	1	1.8	2.6
	DV due to consolidation (in^3)	0.06	0.11	0.16
	Final Volume due to consolidation (in^3)	34.36	34.25	34.09
	Corrected area due to consolidation (in^2)	6.150	6.190	6.237
	Final Height due to consolidation (in)	5.587	5.533	5.466
	Time to 50 % consolidation (min)			
Shearing	Deformation during this experiment (in)	0.05	0.06	0.19
	Strain %	0.9	1.1	3.4
	Corrected Area due to shearing (in^2)	6.203	6.256	6.459
	Final Height due to shearing (in)	5.539	5.474	5.277
Stresses	Initial Pore Pressure reading during this exp. (psi)	47.87	47.90	47.08
	Final Pore pressure reading during this exp. (psi)	52.97	55.78	57.16
	Pore pressure (psi)	5.10	7.88	10.08
	Effective minor principal stress (psi)	-0.10	2.12	4.92
	Deviator Force (Lbf)	67.14	90.31	146.58
	Deviator Stress (psi)	10.8	14.4	22.7
	Effective major principal stress (psi)	10.7	16.6	27.6

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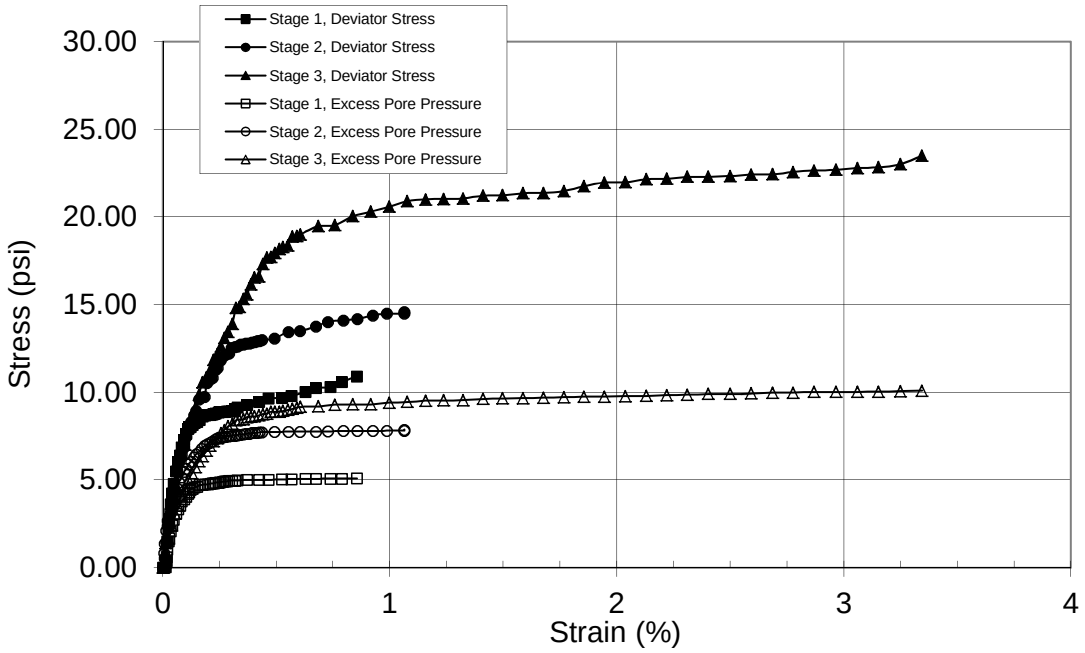
ASTM D-4767



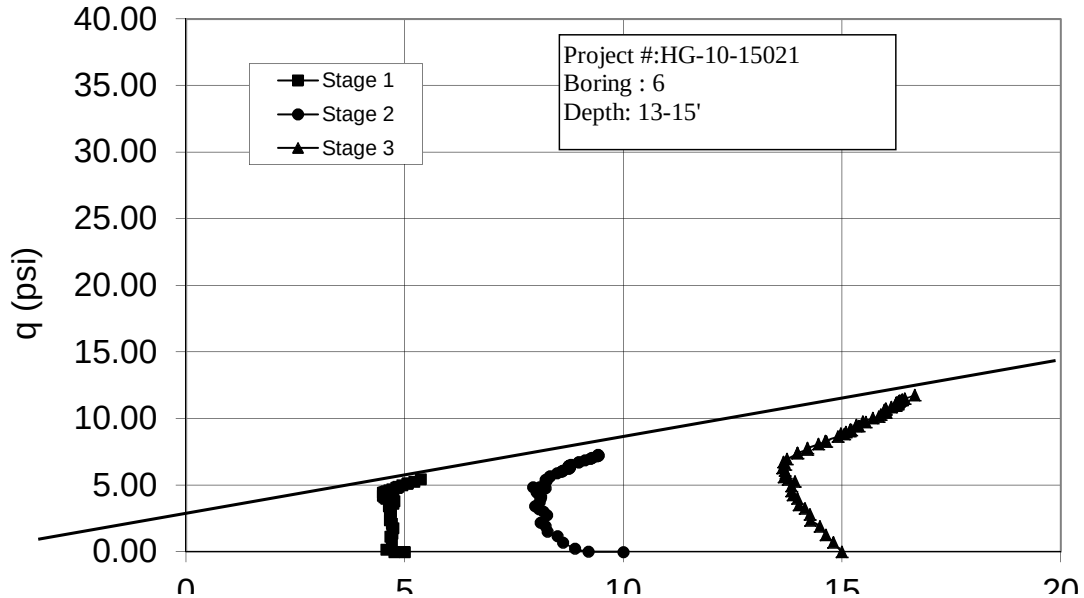


PLATE G-7b

Effective Stress Envelope

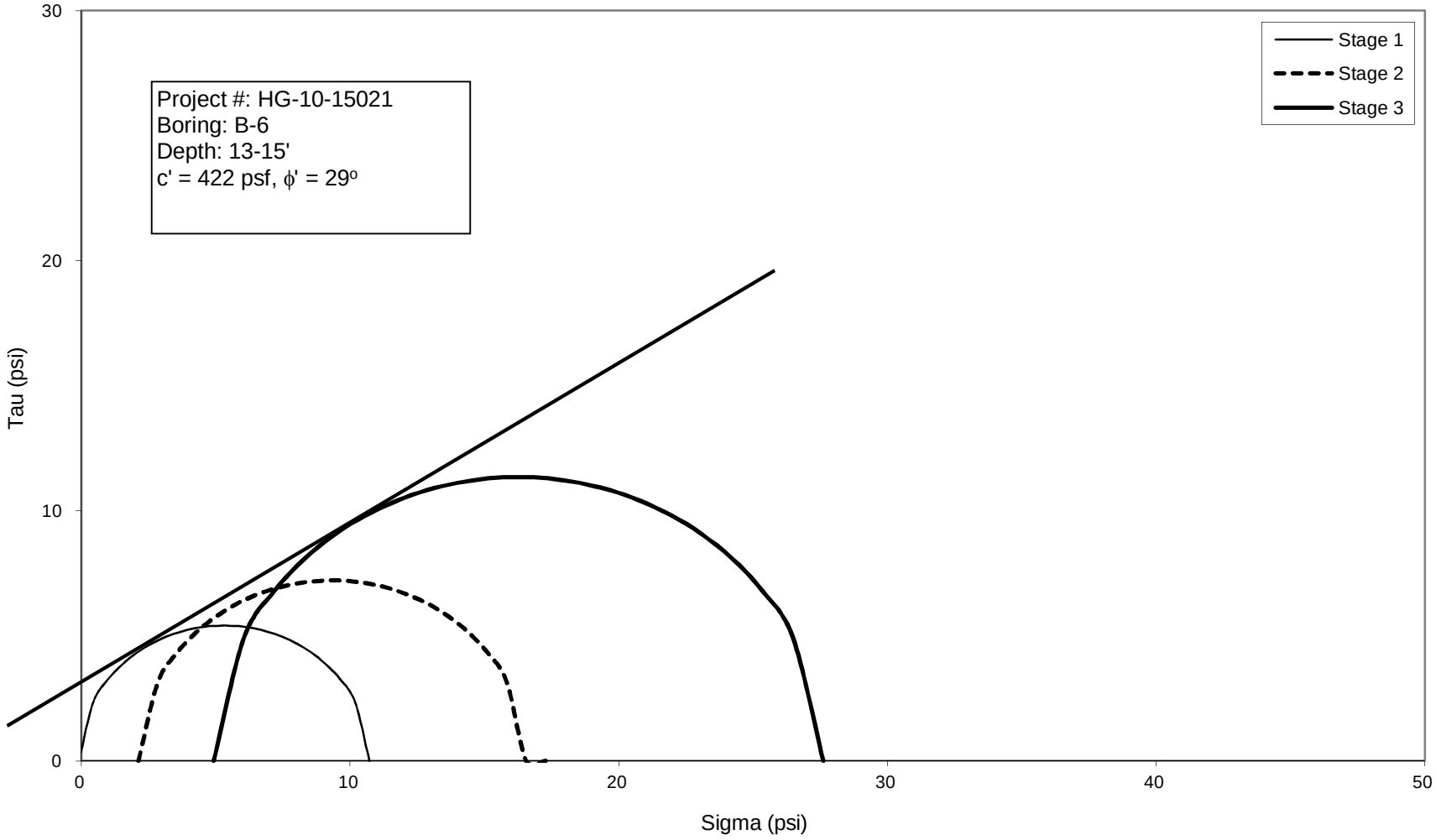


PLATE G-7c

APPENDIX H

CONSOLIDATION TEST RESULTS

HVJ ASSOCIATES, INC.
CONSOLIDATION TEST RESULTS
ASTM D-2435

Project Name:	**Battleship Texas**	**Boring No.**	**3**
Project No.	**HG1015021**	**Sample No.**	**37**
Date Tested:	**12/7/2010 - 1/5/2011**	**Sample Depth**	**168-170'**
Technician:	**KC**	**Date Calculated:**	**1/5/2011**

Sample Data	Initial	Final	Test Data	Initial	Final
Sample Height (in)	0.750	0.692	Wet + Ring (g)	172.160	169.030
Diameter (in)	2.500	2.500	Dry + Ring (g)	143.220	143.220
Volume (cc)	60.330	55.696	Ring Wt. (g)	61.060	61.060
Height of Solids (in)	0.378	0.378	Moisture Data (Trimmings)		LL
Specific Gravity	2.700	2.700	Wet + Tare (g)	111.190	
Moisture Content (%)	35.224	31.414	Dry + Tare (g)	90.010	PI
Wet Density (pcf)	114.912	120.965	Tare (g)	29.890	
Dry Density (pcf)	84.979	92.049	Moisture Content (%)	35.230	
Void Ratio	0.983	0.830	Sample Description	brownish grey clay with silt laminations	
Percent Saturation	96.789	102.150			
Results					
Pre-Consolidation Pressure (tsf)	6.0		Compression Index, Cc	0.533	
Over-Consolidation Ratio, OCR	1.1		Swell Index, Cs	0.070	

Applied Press. (tsf)	Calibr. Rdg. (in.)	Def. Rdg. (in.)	Corr. Cum Reading (in.)	Strain (%)	Void Ratio Change	Void Ratio	t_{50} (min.)	C_v (in^2/day)
0.356	0.0035	0.0065	0.0030	0.40	0.01	0.97	0.25	
0.710	0.0052	0.0088	0.0036	0.48	0.01	0.97	0.25	
1.419	0.0073	0.0151	0.0078	1.04	0.02	0.96	2.50	
2.742	0.0094	0.0264	0.0170	2.27	0.04	0.94	6.50	5.86
5.517	0.0118	0.0455	0.0337	4.49	0.09	0.89	8.00	4.55
2.742	0.0094	0.0415	0.0321	4.28	0.08	0.90	3.60	10.15
0.678	0.0050	0.0261	0.0211	2.81	0.06	0.93	16.00	2.35
1.419	0.0073	0.0290	0.0217	2.89	0.06	0.93	7.00	5.37
2.839	0.0096	0.0363	0.0267	3.56	0.07	0.91	6.50	5.71
5.677	0.0122	0.0476	0.0354	4.72	0.09	0.89	5.90	6.14
11.387	0.0149	0.0802	0.0653	8.71	0.17	0.81	19.00	1.75
22.741	0.0178	0.1431	0.1253	16.71	0.33	0.65	31.00	0.89
11.387	0.0162	0.1377	0.1215	16.20	0.32	0.66	8.50	3.29
2.839	0.0131	0.1110	0.0979	13.05	0.26	0.72	28.00	1.08
0.356	0.0087	0.0663	0.0576	7.68	0.15	0.83	95.00	0.36

PLATE H-1a

HVJ ASSOCIATES, INC.
CONSOLIDATION TEST RESULTS

Project Name:	Battleship Texas	Boring No.	3
Project No.	HG1015021	Sample No.	37
		Sample Depth	168-170'

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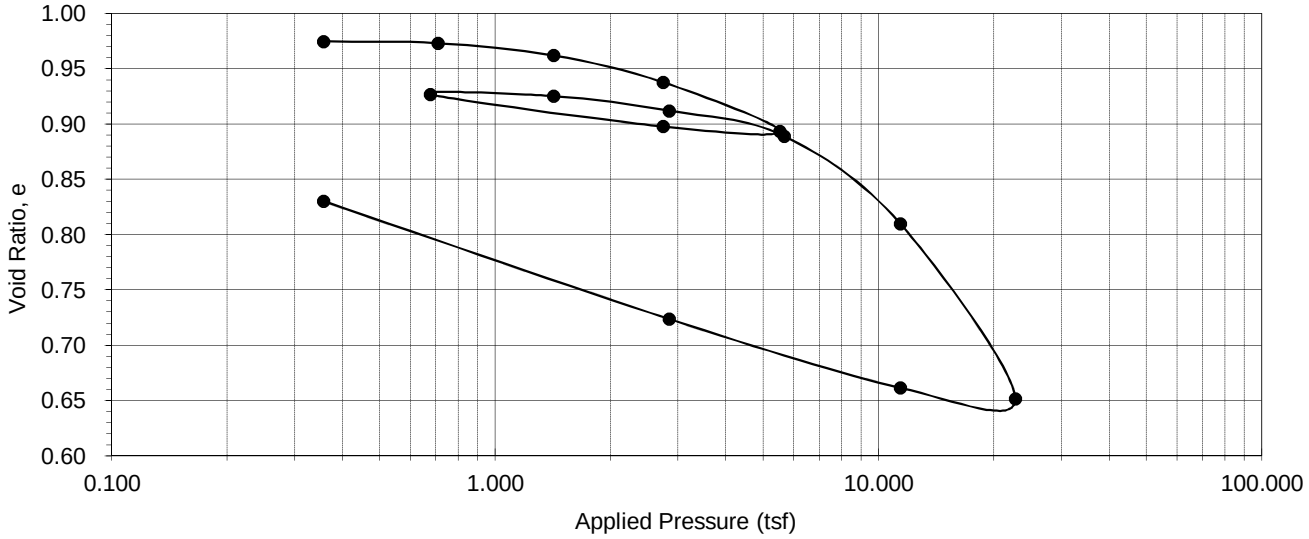


Cv - Log(p) Curve

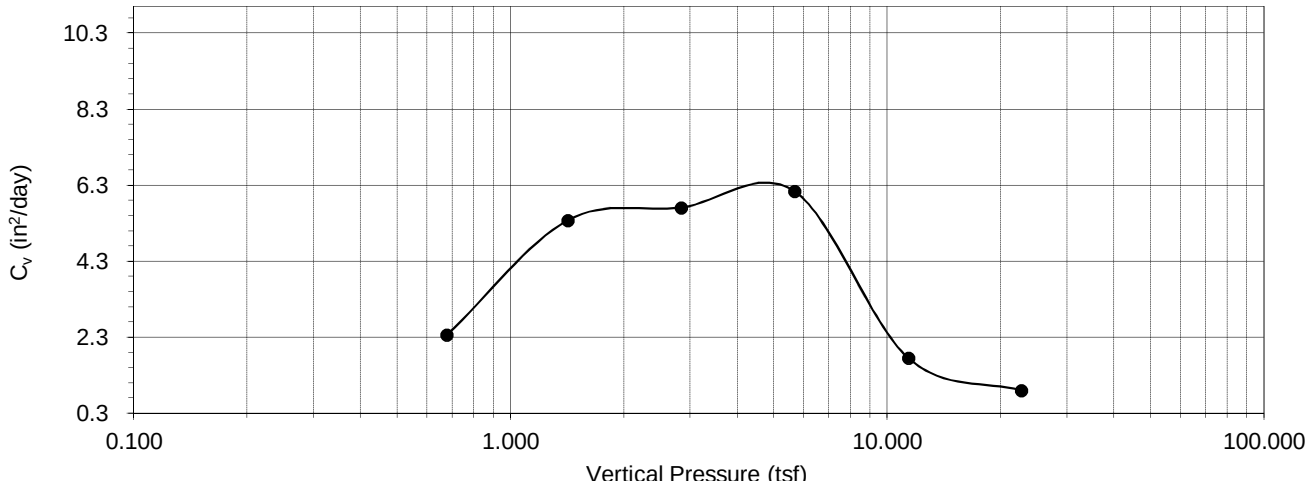


PLATE H-1b

HVJ ASSOCIATES, INC.
CONSOLIDATION TEST RESULTS
ASTM D-2435

Project Name:	**Battleship Texas**	**Boring No.**	**3**
Project No.	**HG1015021**	**Sample No.**	**43**
Date Tested:	**12/8/2010 - 1/12/2011**	**Sample Depth**	**198-200'**
Technician:	**KC**	**Date Calculated:**	**1/13/2011**

Sample Data	Initial	Final	Test Data	Initial	Final
Sample Height (in)	0.775	0.724	Wet + Ring (g)	267.510	267.000
Diameter (in)	2.500	0.270	Dry + Ring (g)	244.370	244.370
Volume (cc)	62.341	0.679	Ring Wt. (g)	149.710	149.700
Height of Solids (in)	0.436	37.371	Moisture Data (Trimmings)		LL
Specific Gravity	2.700	2.700	Wet + Tare (g)	132.240	
Moisture Content (%)	24.445	23.904	Dry + Tare (g)	112.160	PI
Wet Density (pcf)	117.912	10782.659	Tare (g)	30.030	
Dry Density (pcf)	94.750	8702.424	Moisture Content (%)	24.449	
Void Ratio	0.778	-0.981	Sample Description	brown silty sandy clay with light brown silty sand	
Percent Saturation	84.819	-65.815			
Results					
Pre-Consolidation Pressure (tsf)	3.8		Compression Index, Cc	0.166	
Over-Consolidation Ratio, OCR	0.6		Swell Index, Cs	0.022	

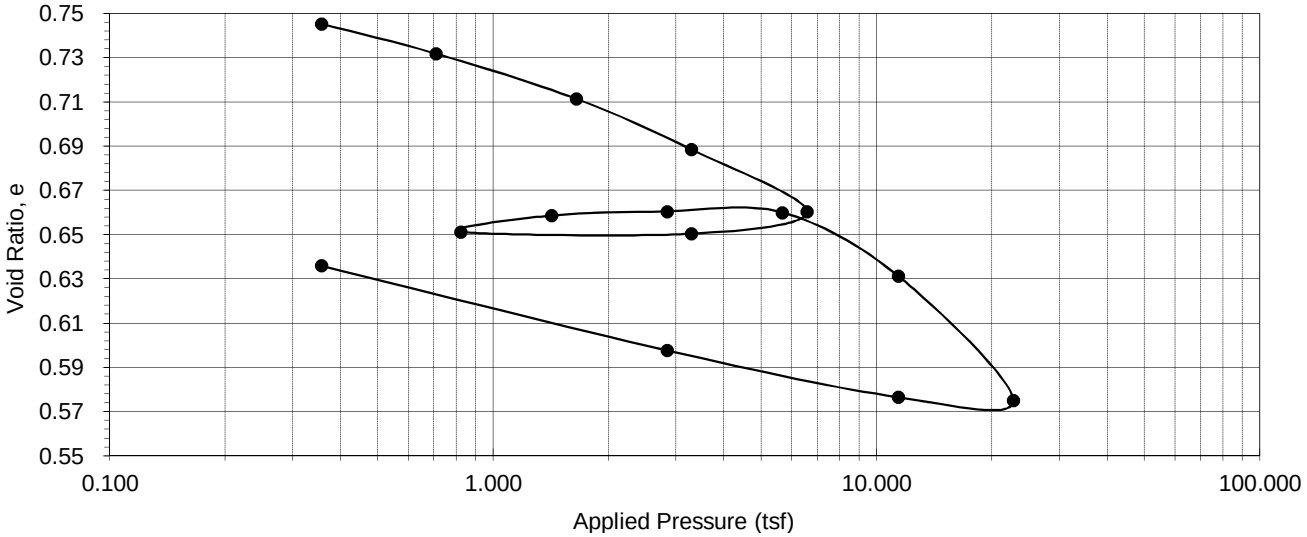
Applied Press. (tsf)	Calibr. Rdg. (in.)	Def. Rdg. (in.)	Corr. Cum Reading (in.)	Strain (%)	Void Ratio Change	Void Ratio	t_{50} (min.)	C_v (in^2/day)
0.356	0.0078	0.0221	0.0143	1.85	0.03	0.75	1.30	
0.710	0.0115	0.0317	0.0202	2.61	0.05	0.73	6.20	
1.647	0.0182	0.0473	0.0291	3.75	0.07	0.71	3.20	
3.290	0.0241	0.0632	0.0391	5.05	0.09	0.69	4.50	8.53
6.579	0.0313	0.0826	0.0513	6.62	0.12	0.66	9.50	3.91
3.290	0.0241	0.0798	0.0557	7.19	0.13	0.65	2.00	18.34
0.822	0.0124	0.0677	0.0553	7.14	0.13	0.65	11.00	3.34
1.419	0.0173	0.0694	0.0521	6.72	0.12	0.66	2.00	18.53
2.839	0.0230	0.0743	0.0513	6.62	0.12	0.66	4.90	7.58
5.677	0.0303	0.0818	0.0515	6.65	0.12	0.66	2.50	14.85
11.387	0.0365	0.1005	0.0640	8.26	0.15	0.63	9.00	3.98
22.741	0.0425	0.1310	0.0885	11.42	0.20	0.58	9.50	3.52
11.387	0.0408	0.1287	0.0879	11.34	0.20	0.58	1.00	33.47
2.839	0.0370	0.1157	0.0787	10.15	0.18	0.60	5.20	6.61
0.356	0.0280	0.0900	0.0620	8.00	0.14	0.64	33.00	1.09

PLATE H-2a

HVJ ASSOCIATES, INC.
CONSOLIDATION TEST RESULTS

Project Name:	Battleship Texas	Boring No.	3
Project No.	HG1015021	Sample No.	43
		Sample Depth	198-200'

e - Log(p) Curve



Cv - Log(p) Curve

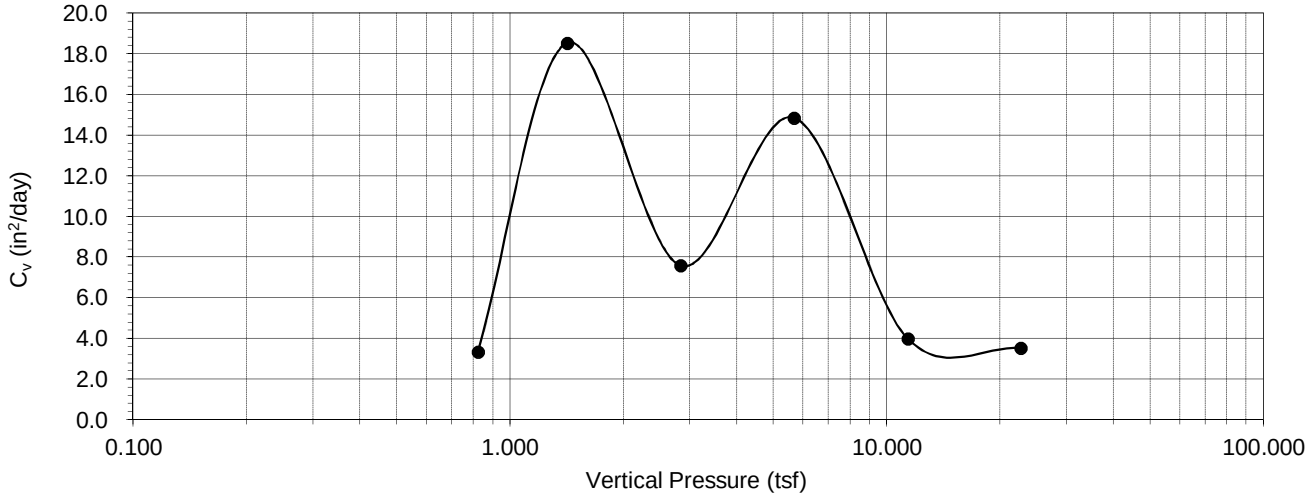


PLATE H-2b

HVJ ASSOCIATES, INC.

CONSOLIDATION TEST RESULTS

ASTM D-2435

Project Name:	Battleship Texas	Boring No.	B-4
Project No.	HG-10-15021	Sample No.	S-7
Date Tested:	12/21/10 - 01/07/11	Sample Depth	18-20'
Technician:	KM/DB	Date Calculated:	01/19/11
Checked By:	DB	Date Checked:	01/19/11

Sample Data	**Initial**	**Final**	**Test Data**	**Initial**	**Final**
Sample Height (in)	0.745	0.711	Wet + Ring (g)	202.81	201.68
Diameter (in)	2.488	2.488	Dry + Ring (g)	183.15	183.15
Volume (cc)	59.35	56.66	Ring Wt. (g)	77.25	77.25
Height of Solids (in)	0.478	0.478	**Moisture Data (Trimmings)**		**LL**
Specific Gravity	2.78	2.78	Wet + Tare (g)	108.69	
Moisture Content (%)	18.56	17.50	Dry + Tare (g)	97.22	**PI**
Wet Density (pcf)	132.00	137.03	Tare (g)	30.96	
Dry Density (pcf)	111.335	116.627	Moisture Content (%)	17.31	
Void Ratio	0.558	0.487	**Sample Description**		
Percent Saturation	92.5	99.8			
Results					
Pre-Consolidation Pressure (tsf)	1.2		Compression Index, Cc	0.056	
Over-Consolidation Ratio, OCR	2.0		Swell Index, Cs	0.009	

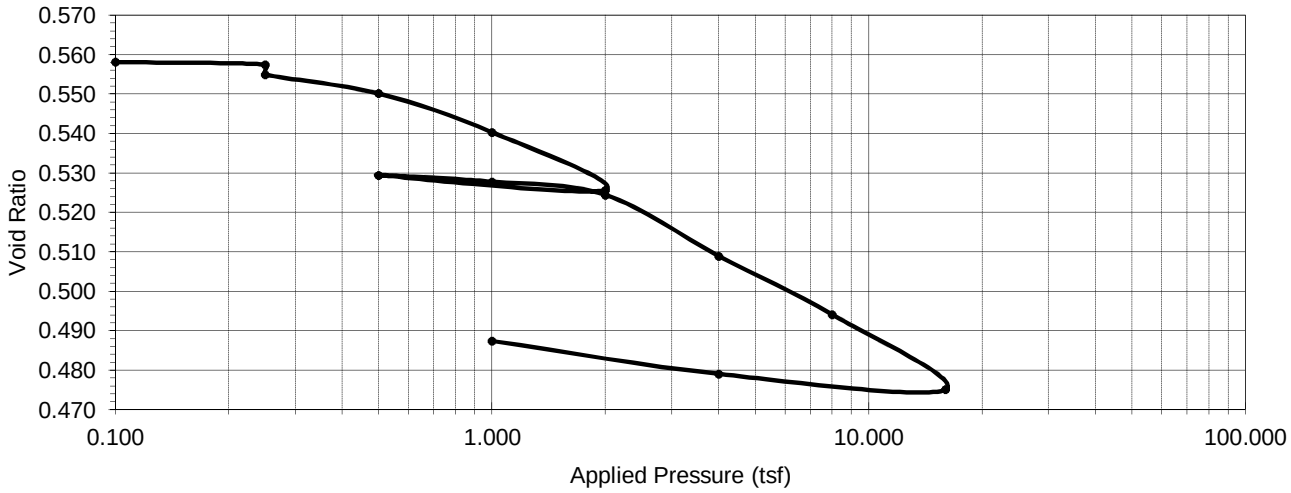
Load No.	**Applied Press. (tsf)**	**Machine Defl. Rdg. (in.)**	**Load Def. Rdg. (in.)**	**Corr. Defl. Reading (in.)**	**Sample Height (in)**	**Strain (%)**	**Void Ratio Change**	**Void Ratio**
0	0.100	0.0000	0.0000	0.0000	0.7450	0.00	0.000	0.558
1	0.250	0.0050	0.0053	0.0003	0.7447	0.04	0.001	0.557
2	0.250	0.0052	0.0067	0.0015	0.7435	0.20	0.003	0.555
3	0.500	0.0065	0.0103	0.0038	0.7412	0.51	0.008	0.550
4	1.000	0.0074	0.0159	0.0085	0.7365	1.14	0.018	0.540
5	2.000	0.0082	0.0237	0.0155	0.7295	2.08	0.032	0.526
6	0.500	0.0080	0.0217	0.0137	0.7313	1.84	0.029	0.529
7	1.0000	0.0082	0.0227	0.0145	0.7305	1.95	0.030	0.528
8	2.0000	0.0087	0.0248	0.0161	0.7289	2.16	0.034	0.524
9	4.0000	0.0094	0.0329	0.0235	0.7215	3.15	0.049	0.509
10	8.0000	0.0110	0.0416	0.0306	0.7144	4.11	0.064	0.494
11	16.0000	0.0126	0.0523	0.0397	0.7053	5.33	0.083	0.475
12	4.0000	0.0110	0.0488	0.0378	0.7072	5.07	0.079	0.479
13	1.0000	0.0104	0.0442	0.0338	0.7112	4.54	0.071	0.487

PLATE H-3a

HVJ ASSOCIATES, INC.
SWELL TEST GRAPHS

Project Name:	Battleship Texas	Boring No.	B-4
Project No.	HG1015021	Sample No.	S-7
		Sample Depth	18-20'

Void Ratio - Log(p) Curve



Strain - Log(p) Curve

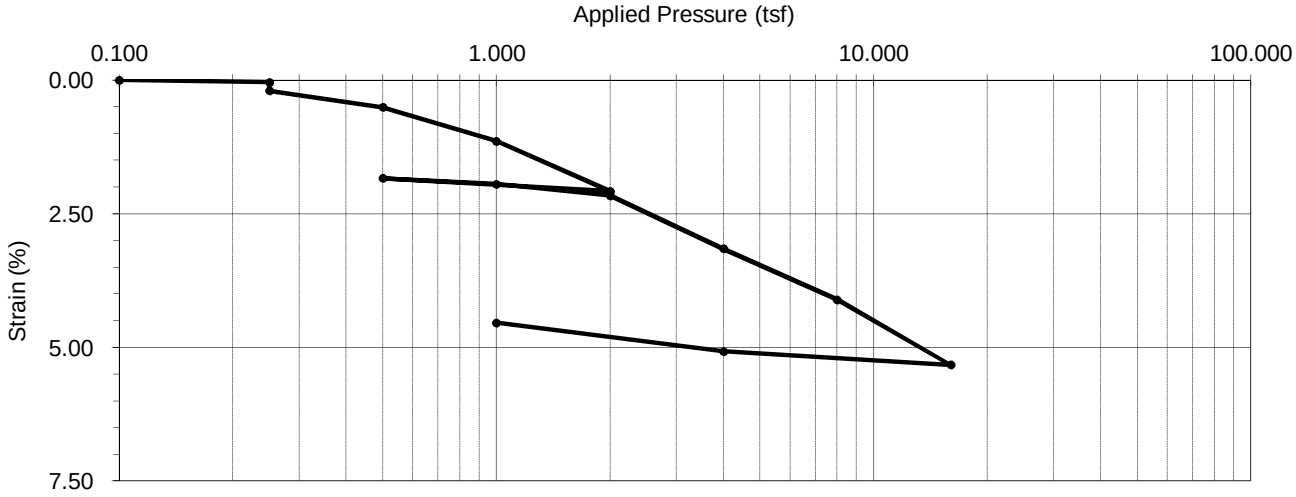


PLATE H-3b

HVJ ASSOCIATES, INC.

CONSOLIDATION TEST RESULTS
ASTM D-2435

Project Name:	Battleship Texas	Boring No.	B-4
Project No.	HG1015021	Sample No.	S-17
Date Tested:	1/22/11 - 2/22/11	Sample Depth	73-75'
Technician:	KM/DB	Date Calculated:	02/24/11
Checked By:	DB	Date Checked:	02/24/11

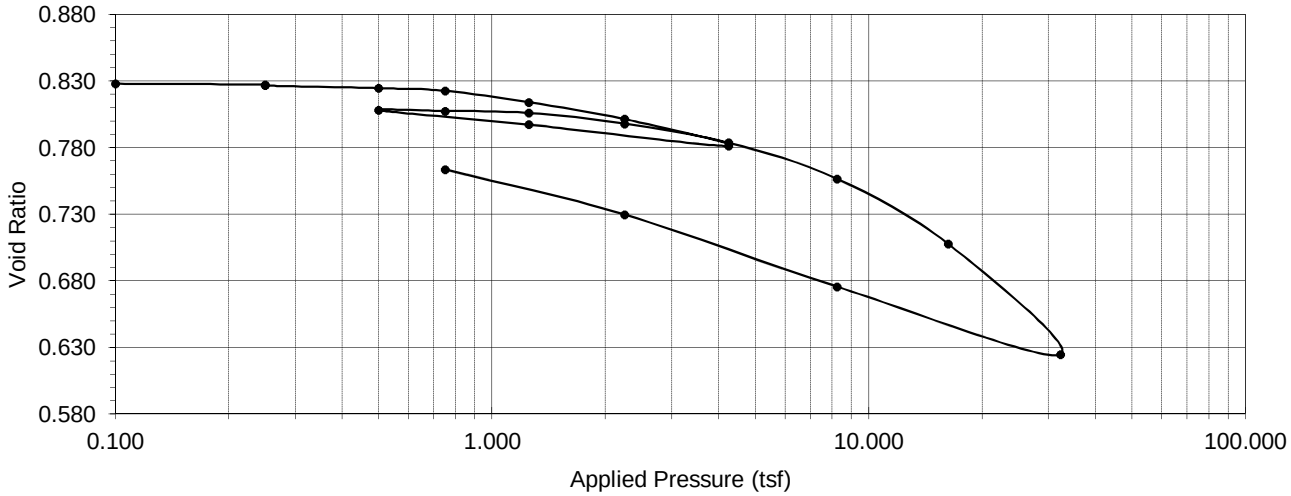
Sample Data	**Initial**	**Final**	**Test Data**	**Initial**	**Final**
Sample Height (in)	0.750	0.732	Wet + Ring (g)	193.37	193.56
Diameter (in)	2.494	2.494	Dry + Ring (g)	167.92	167.92
Volume (cc)	60.04	58.58	Ring Wt. (g)	76.61	76.61
Height of Solids (in)	0.410	0.410	**Moisture Data (Trimmings)**		**LL**
Specific Gravity	2.78	2.78	Wet + Tare (g)	116.15	
Moisture Content (%)	27.87	28.08	Dry + Tare (g)	97.57	**PI**
Wet Density (pcf)	121.35	124.57	Tare (g)	31.08	
Dry Density (pcf)	94.898	97.258	Moisture Content (%)	27.94	
Void Ratio	0.828	0.784	**Sample Description**		
Percent Saturation	93.6	99.6			
Results					
Pre-Consolidation Pressure (tsf)	4.0		Compression Index, Cc	0.279	
Over-Consolidation Ratio, OCR	1.7		Swell Index, Cs	0.090	

Load No.	**Applied Press. (tsf)**	**Machine Defl. Rdg. (in.)**	**Load Def. Rdg. (in.)**	**Corr. Defl. Reading (in.)**	**Sample Height (in)**	**Strain (%)**	**Void Ratio Change**	**Void Ratio**
0	0.100	0.0000	0.0000	0.0000	0.7500	0.00	0.000	0.828
1	0.250	0.0040	0.0043	0.0003	0.7497	0.04	0.001	0.827
2	0.250	0.0042	0.0048	0.0006	0.7494	0.08	0.001	0.827
3	0.500	0.0055	0.0069	0.0014	0.7486	0.19	0.003	0.825
4	0.750	0.0061	0.0083	0.0022	0.7478	0.29	0.005	0.823
5	1.250	0.0069	0.0126	0.0057	0.7443	0.76	0.014	0.814
6	2.250	0.0080	0.0189	0.0109	0.7391	1.45	0.027	0.801
7	4.2500	0.0091	0.0283	0.0192	0.7308	2.56	0.047	0.781
8	1.2500	0.0086	0.0212	0.0126	0.7374	1.68	0.031	0.797
9	0.5000	0.0082	0.0164	0.0082	0.7418	1.09	0.020	0.808
10	0.7500	0.0088	0.0172	0.0084	0.7416	1.12	0.020	0.808
11	1.2500	0.0097	0.0187	0.0090	0.7410	1.20	0.022	0.806

HVJ ASSOCIATES, INC.
SWELL TEST GRAPHS

Project Name:	Battleship Texas	Boring No.	B-4
Project No.	HG1015021	Sample No.	S-17
		Sample Depth	73-75'
		Swell Index, Cs	0.09

Void Ratio - Log(p) Curve



Strain - Log(p) Curve

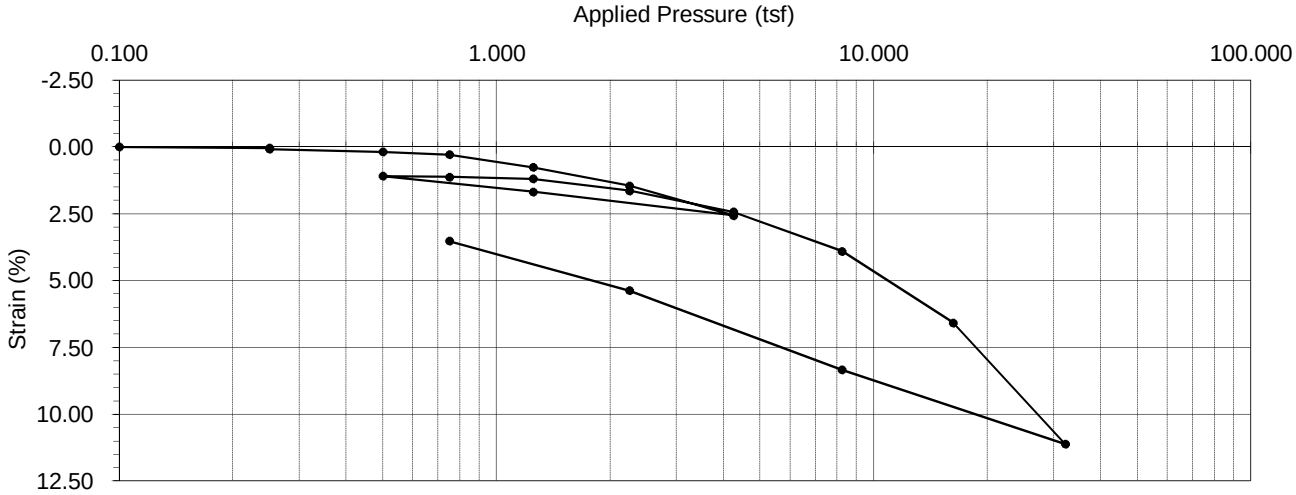


PLATE H-4b

HVJ ASSOCIATES, INC.

CONSOLIDATION TEST RESULTS
ASTM D-2435

Project Name:	Battleship Texas	Boring No.	B-5
Project No.	HG1015021	Sample No.	S-11
Date Tested:	12/21/10 - 01/06/11	Sample Depth	38-40'
Technician:	KM/DB	Date Calculated:	01/19/11
Checked By:	DB	Date Checked:	01/19/11

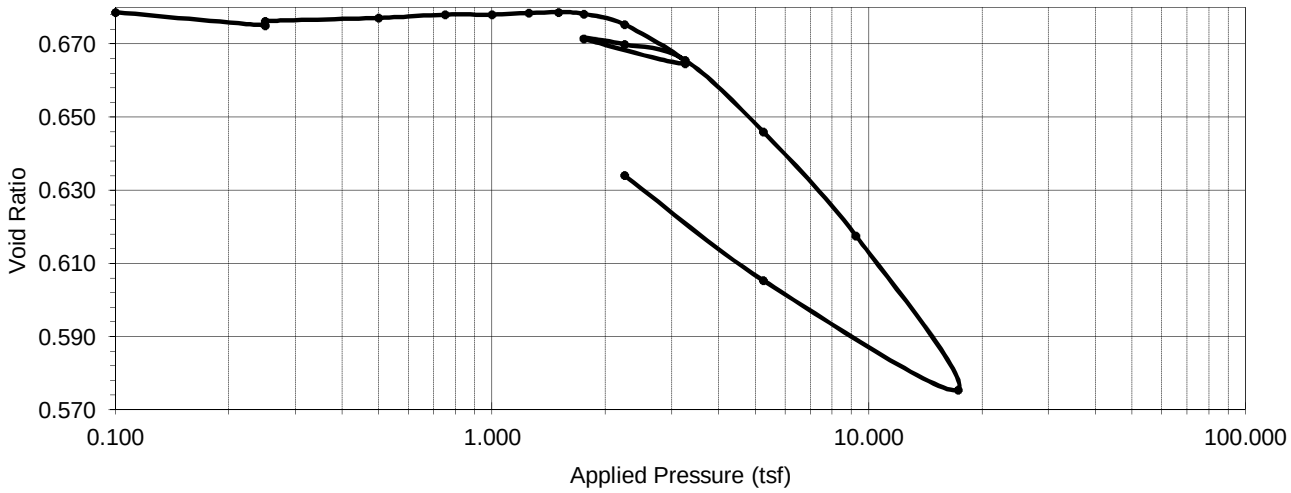
Sample Data	**Initial**	**Final**	**Test Data**	**Initial**	**Final**
Sample Height (in)	0.744	0.724	Wet + Ring (g)	197.10	196.87
Diameter (in)	2.486	2.486	Dry + Ring (g)	174.59	174.59
Volume (cc)	59.18	57.60	Ring Wt. (g)	76.94	76.94
Height of Solids (in)	0.443	0.443	**Moisture Data (Trimmings)**		**LL**
Specific Gravity	2.77	2.77	Wet + Tare (g)	122.60	
Moisture Content (%)	23.05	22.82	Dry + Tare (g)	104.82	**PI**
Wet Density (pcf)	126.70	129.92	Tare (g)	31.42	
Dry Density (pcf)	102.965	105.780	Moisture Content (%)	24.22	
Void Ratio	0.679	0.634	**Sample Description**		
Percent Saturation	94.1	99.7			
Results					
Pre-Consolidation Pressure (tsf)	3.5		Compression Index, Cc	0.227	
Over-Consolidation Ratio, OCR	2.8		Swell Index, Cs	0.066	

Load No.	Applied Press. (tsf)	Machine Defl. Rdg. (in.)	Load Def. Rdg. (in.)	Corr. Defl. Reading (in.)	Sample Height (in)	Strain (%)	Void Ratio Change	Void Ratio
0	0.100	0.0000	0.0000	0.0000	0.7440	0.00	0.000	0.679
1	0.250	0.0041	0.0057	0.0016	0.7424	0.22	0.004	0.675
2	0.250	0.0045	0.0056	0.0011	0.7429	0.15	0.002	0.676
3	0.500	0.0058	0.0065	0.0007	0.7433	0.09	0.002	0.677
4	0.750	0.0068	0.0071	0.0003	0.7437	0.04	0.001	0.678
5	1.000	0.0074	0.0077	0.0003	0.7437	0.04	0.001	0.678
6	1.250	0.0079	0.0080	0.0001	0.7439	0.01	0.000	0.678
7	1.5000	0.0083	0.0083	0.0000	0.7440	0.00	0.000	0.679
8	1.7500	0.0087	0.0089	0.0002	0.7438	0.03	0.000	0.678
9	2.2500	0.0092	0.0107	0.0015	0.7425	0.20	0.003	0.675
10	3.2500	0.0100	0.0162	0.0062	0.7378	0.83	0.014	0.665
11	1.7500	0.0097	0.0129	0.0032	0.7408	0.43	0.007	0.671
12	2.2500	0.0098	0.0137	0.0039	0.7401	0.52	0.009	0.670
13	3.2500	0.0104	0.0162	0.0058	0.7382	0.78	0.013	0.666
14	5.2500	0.0111	0.0256	0.0145	0.7295	1.95	0.033	0.646
15	9.2500	0.0125	0.0396	0.0271	0.7169	3.64	0.061	0.618
16	17.2500	0.0143	0.0601	0.0458	0.6982	6.16	0.103	0.575
17	5.2500	0.0122	0.0447	0.0325	0.7115	4.37	0.073	0.605
18	2.2500	0.0116	0.0314	0.0198	0.7242	2.66	0.045	0.634

HVJ ASSOCIATES, INC.
SWELL TEST GRAPHS

Project Name:	Battleship Texas	Boring No.	B-5
Project No.	HG-10-15021	Sample No.	S-11
		Sample Depth	38-40'

Void Ratio - Log(p) Curve



Strain - Log(p) Curve

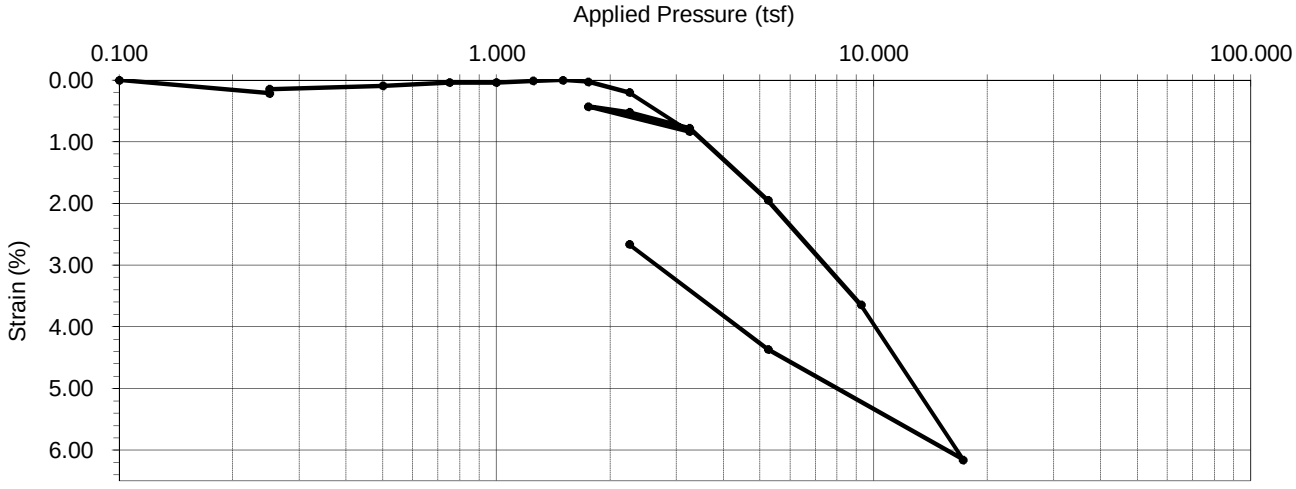


PLATE H-5b

HVJ ASSOCIATES, INC.

CONSOLIDATION TEST RESULTS
ASTM D-2435

Project Name:	Battleship Texas	Boring No.	B-5
Project No.	HG-10-15021	Sample No.	S-28
Date Tested:	12/21/10 - 01/12/11	Sample Depth	123-125'
Technician:	KM/DB	Date Calculated:	01/19/11
Checked By:	DB	Date Checked:	01/19/11

Sample Data	**Initial**	**Final**	**Test Data**	**Initial**	**Final**
Sample Height (in)	0.738	0.718	Wet + Ring (g)	194.75	193.75
Diameter (in)	2.488	2.488	Dry + Ring (g)	168.05	168.05
Volume (cc)	58.80	57.21	Ring Wt. (g)	76.61	76.61
Height of Solids (in)	0.403	0.403	**Moisture Data (Trimmings)**		**LL**
Specific Gravity	2.85	2.85	Wet + Tare (g)	116.98	
Moisture Content (%)	29.20	28.11	Dry + Tare (g)	97.76	**PI**
Wet Density (pcf)	125.38	127.77	Tare (g)	31.11	
Dry Density (pcf)	97.045	99.734	Moisture Content (%)	28.84	
Void Ratio	0.833	0.783	**Sample Description**		
Percent Saturation	100.0	102.3			
Results					
Pre-Consolidation Pressure (tsf)	6.0		Compression Index, Cc	0.268	
Over-Consolidation Ratio, OCR	1.6		Swell Index, Cs	0.100	

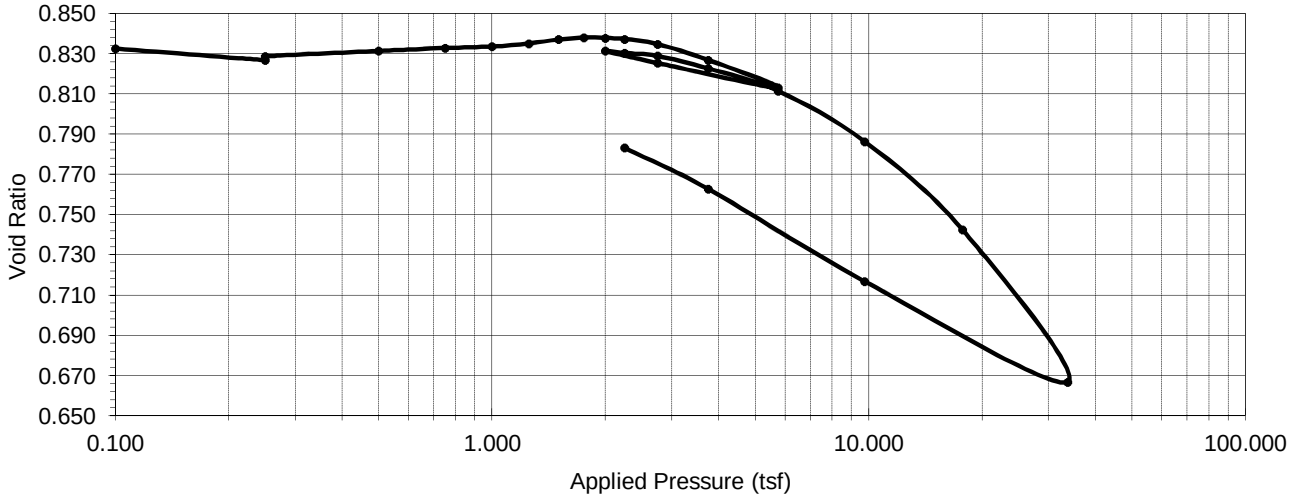
Load No.	Applied Press. (tsf)	Machine Defl. Rdg. (in.)	Load Def. Rdg. (in.)	Corr. Defl. Reading (in.)	Sample Height (in)	Strain (%)	Void Ratio Change	Void Ratio
0	0.100	0.0000	0.0000	0.0000	0.7380	0.00	0.000	0.833
1	0.250	0.0020	0.0043	0.0023	0.7357	0.31	0.006	0.827
2	0.250	0.0025	0.0041	0.0016	0.7364	0.22	0.004	0.829
3	0.500	0.0036	0.0041	0.0005	0.7375	0.07	0.001	0.831
4	0.750	0.0046	0.0045	-0.0001	0.7381	-0.01	0.000	0.833
5	1.000	0.0051	0.0047	-0.0004	0.7384	-0.05	-0.001	0.834
6	1.250	0.0057	0.0047	-0.0010	0.7390	-0.14	-0.002	0.835
7	1.5000	0.0062	0.0044	-0.0018	0.7398	-0.24	-0.004	0.837
8	1.7500	0.0065	0.0043	-0.0022	0.7402	-0.30	-0.005	0.838
9	2.0000	0.0068	0.0047	-0.0021	0.7401	-0.28	-0.005	0.838
10	2.2500	0.0071	0.0052	-0.0019	0.7399	-0.26	-0.005	0.837
11	2.7500	0.0075	0.0066	-0.0009	0.7389	-0.12	-0.002	0.835
12	3.7500	0.0082	0.0105	0.0023	0.7357	0.31	0.006	0.827
13	5.7500	0.0094	0.0173	0.0079	0.7301	1.07	0.020	0.813
14	2.7500	0.0088	0.0117	0.0029	0.7351	0.39	0.007	0.825
15	2.0000	0.0083	0.0088	0.0005	0.7375	0.07	0.001	0.831
16	2.2500	0.0083	0.0092	0.0009	0.7371	0.12	0.002	0.830
17	2.7500	0.0086	0.0101	0.0015	0.7365	0.20	0.004	0.829
18	3.7500	0.0089	0.0129	0.0040	0.7340	0.54	0.010	0.823
19	5.7500	0.0095	0.0180	0.0085	0.7295	1.15	0.021	0.811
20	9.7500	0.0108	0.0294	0.0186	0.7194	2.52	0.046	0.786
21	17.7500	0.0128	0.0491	0.0363	0.7017	4.92	0.090	0.742
22	33.7500	0.0156	0.0824	0.0668	0.6712	9.05	0.166	0.667
23	9.7500	0.0134	0.0600	0.0466	0.6914	6.31	0.116	0.717
24	3.7500	0.0121	0.0402	0.0281	0.7099	3.81	0.070	0.763
25	2.2500	0.0114	0.0313	0.0199	0.7181	2.70	0.049	0.783

PLATE H-6a

HVJ ASSOCIATES, INC.
SWELL TEST GRAPHS

Project Name:	Battleship Texas	Boring No.	B-5
Project No.	HG-10-15021	Sample No.	S-28
		Sample Depth	123-125'

Void Ratio - Log(p) Curve



Strain - Log(p) Curve

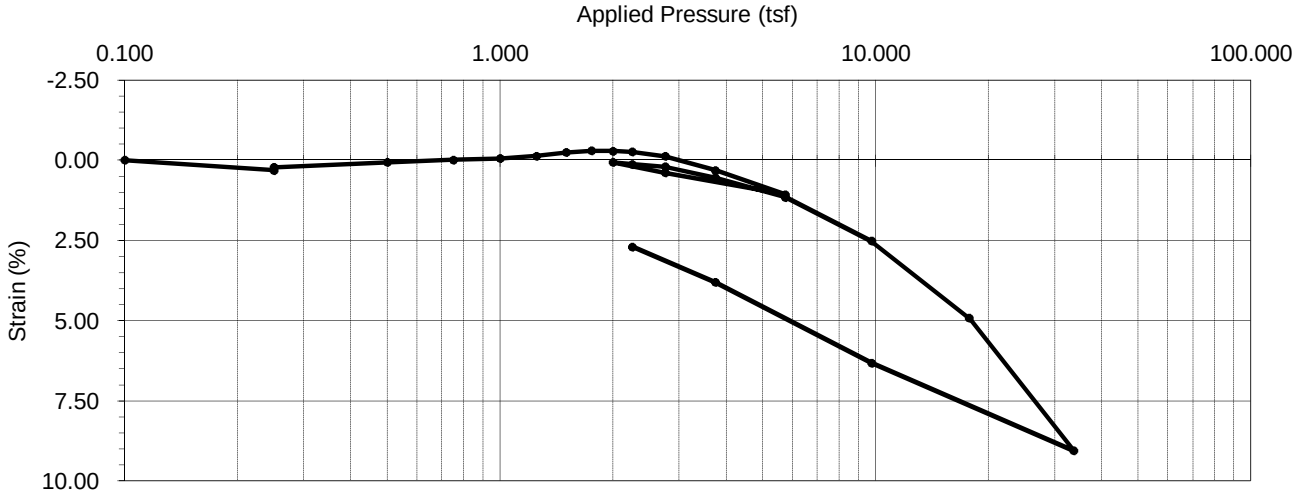


PLATE F-6b